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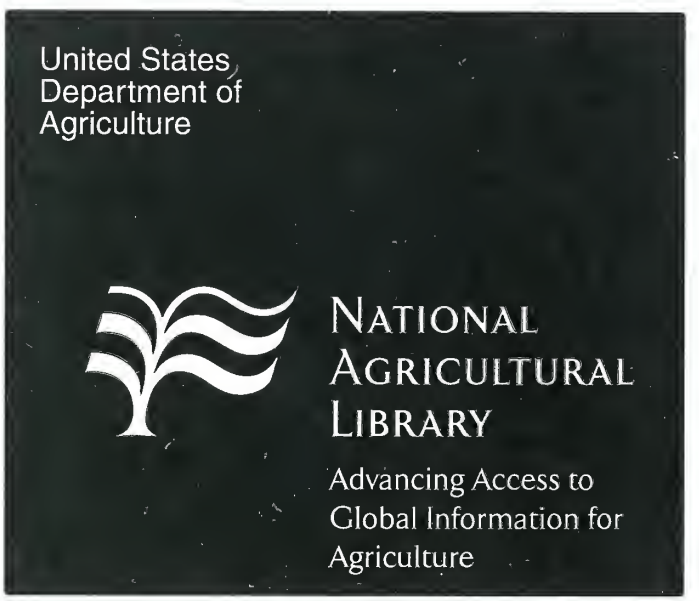
Dakota Prairie
Grasslands

PREHISTORY ON THE DAKOTA PRAIRIE GRASSLANDS: AN OVERVIEW 2012

By Mervin G. Floodman MA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32MZ447: Easy Find Lodge
32MZ1640: Rock Art
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Paleoindian and Woodland line drawings are from South Dakota State Historical Society Web Page "Reaching Out to the Past." Other Line Drawings and Photographs not directly from the Dakota Prairie are all public images taken from images.google.com

Updated radiocarbon ages for all sites are found in Tables 34, 35 and 36.

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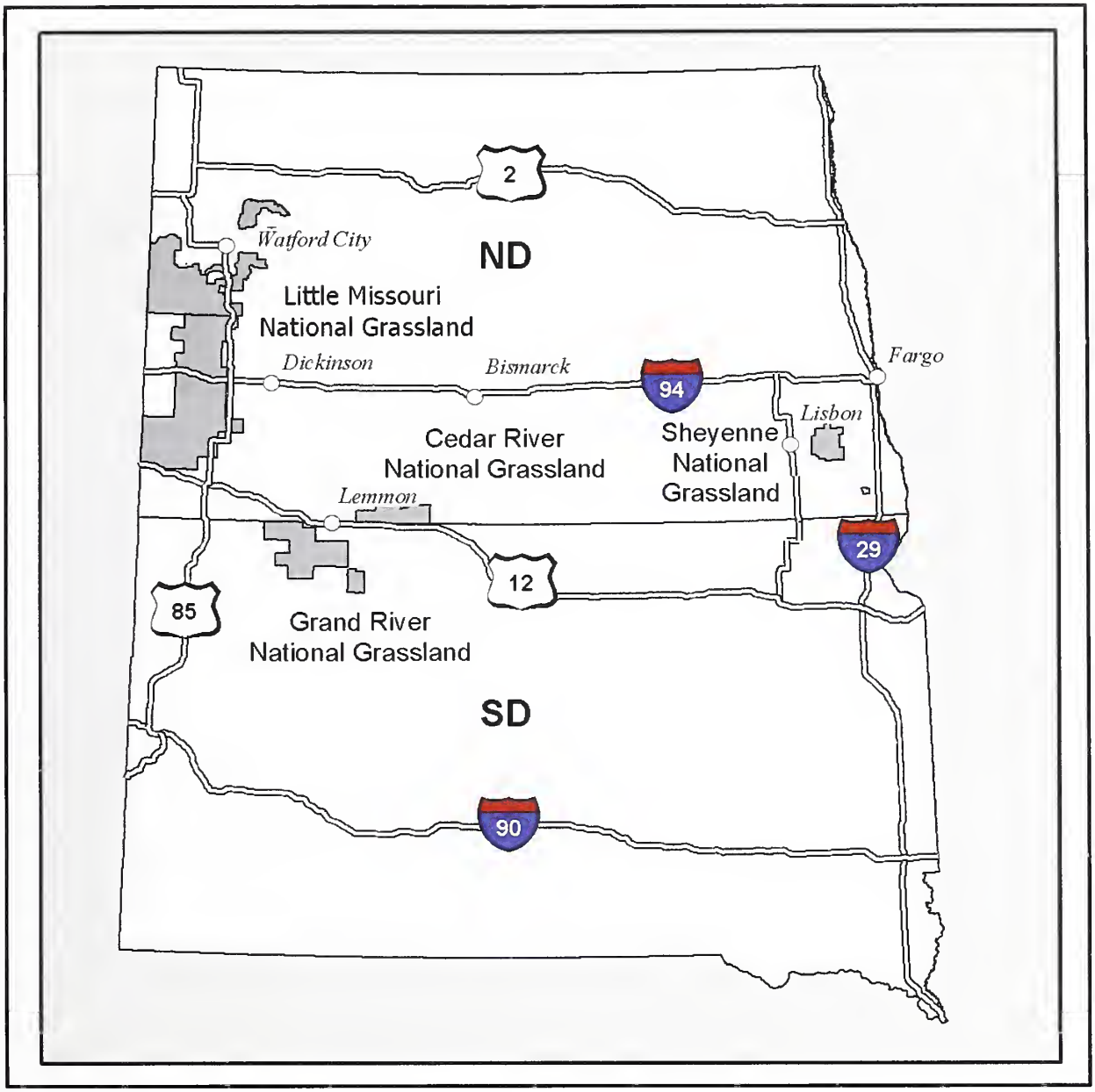


Dakota Prairie Grasslands Vicinity Map

Prehistory on the Dakota Prairie Grasslands: An Overview

Purpose, Need and Scope

The purpose of this Prehistoric Overview is to provide a synthesis of prehistoric resources on the Dakota Prairie Grasslands (DPG) for professional researchers, management and other interested parties. The *National Heritage Program Managed to Standard* (FSM 2362.3) requires, "a synthesis of known cultural resources, traditionally known as a Cultural Resource Overview." In addition, one of the objectives of Goal 2b, of the 2001 *Land and Resource Management Plan of the Dakota Prairie Grasslands*, is to "Within 10 years, update prehistoric, ethnographic and historic overviews." This manuscript fulfills the prehistoric overview portion of these requirements and updates the *Prehistory of the Custer National Forest: An Overview* written by Michael Beckes Ph.D. and James Keyser Ph.D. in 1983.

Introduction

The Dakota Prairie Grasslands is a topographically diverse region. Fairly level stretches of rolling hills with isolated occurrences of Badlands and rock outcrops characterize the 160,931 acre Grand River/Cedar River National Grasslands. Whereas the topography of the 573,700 acre Little Missouri National Grasslands includes a Badlands landscape of intricately dissected drainages and draws dropping from grassy ridgelines, butte-like hills and color banded mounds as well as rolling prairie with inclusions of scattered buttes and Badlands landscapes. The 70,300 acre Sheyenne National Grasslands, on the other hand, contains river terraces, choppy sand hills, hummocky sand hills and deltaic plains (2001:2-2, 2-9, 2-17, 2-24). Study Units used in the overview follow the *North Dakota Comprehensive Plan for Historic Preservation: Archaeology Component* 1990, 1993 and 2008 additions (NDCP), which have different boundaries than the four national grasslands.

The document uses the following categories for dates: Before Present (BP) and *Anno Domini* (AD). This Prehistoric Overview focuses on the prehistoric and protohistoric periods from around 11500 BP to AD 700. Past cultural periods include Paleoindians (11500-7500 BP), Plains Archaic (7500–2400 BP), Plains Woodland (2400 BP – AD 1200), Plains Village (AD 1200-AD 1780) and Equestrian/Fur Trade (AD 1780–1880). The document presents information on past pedestrian surveys, site types, site testing and excavation. It summarizes the information from the existing site and project databases from the National Grasslands. This document deals only with studies conducted within the National Grasslands. It does not, for the most part, incorporate information within the study units from private, state or other federal lands.

Dakota Prairie Grasslands Study Units

NDCP identifies the following study units within the Dakota Prairie Grasslands: The Little Missouri River Study Unit (LMR), The Yellowstone River Study Unit (YSR), The Garrison Study Unit (GA), The Heart River Study Unit (HR), The Cannonball River Study Unit (CR) and the Sheyenne River Study Unit (SR) (NDCP, 1990) and in South Dakota (Winham and Hannus, 1990), identify the Grand/Moreau Tablelands (G/MT) study unit. This overview is data intense and uses the The North Dakota Comprehensive Plan as a framework and selected passages are paraphrased or taken verbatim from the plan. Table 1 summarizes, by national grasslands, the archaeological work completed in these study units through **January, 2011**.

Table 1: Archaeological Summary of Study Units by Grasslands

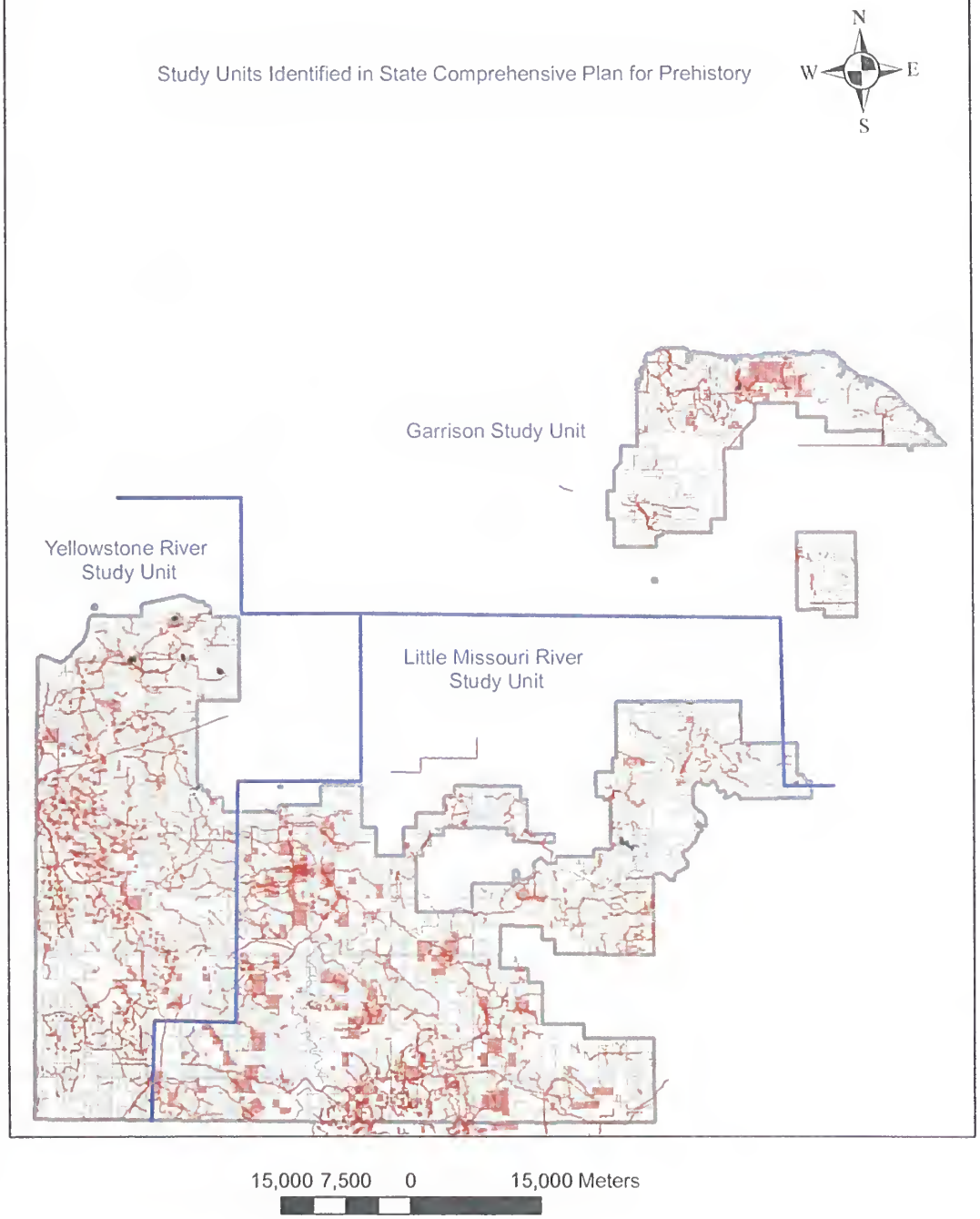
STUDY UNIT	GRASSLAND UNIT	TOTAL ACRES	ACRES SURVEYED	% SURVEYED	TOTAL SITES	SITE DENSITY PER ACRE SURVEY
LMR	Little Missouri	818,620	186,408	23%	1,312	1 site per 142 acres
YSR	Little Missouri	191,500	43,736	23%	401	1 site per 109 acres
GA	Little Missouri	57,200	15,533	27%	377	1 site per 41 acres
HR	Little Missouri	25,240	6,221	25%	71	1 site per 88 acres
CR	Little Missouri	12,440	2,550	20%	32	1 site per 80 acres
CR	Cedar River	6,880	1,712	25%	23	1 site per 74 acres
G/MT	Grand River	155,000	21,478	14%	153	1 site per 140 acres
SR	Sheyenne	70,000	5,465	8%	35	1 site per 156 acres
TOTALS		**1,336,880**	**283,103**	**21%**	**2,404**	**1 site per 117 acres**

Twenty-one percent of the Dakota Prairie Grasslands has been inventoried for cultural resources with a total of 2,404 sites recorded, or about one site per 117-acres of inventory. The following sections outline the seven study units and provide information on location, physiographic overview, a summary of previous cultural resource investigations as well as recorded prehistoric and protohistoric sites. This summarized work provides a snapshot of past human occupation of the region based surface reconnaissance and several sites excavated to determine National Register (NRHP) eligibility.

The Little Missouri River Study Unit

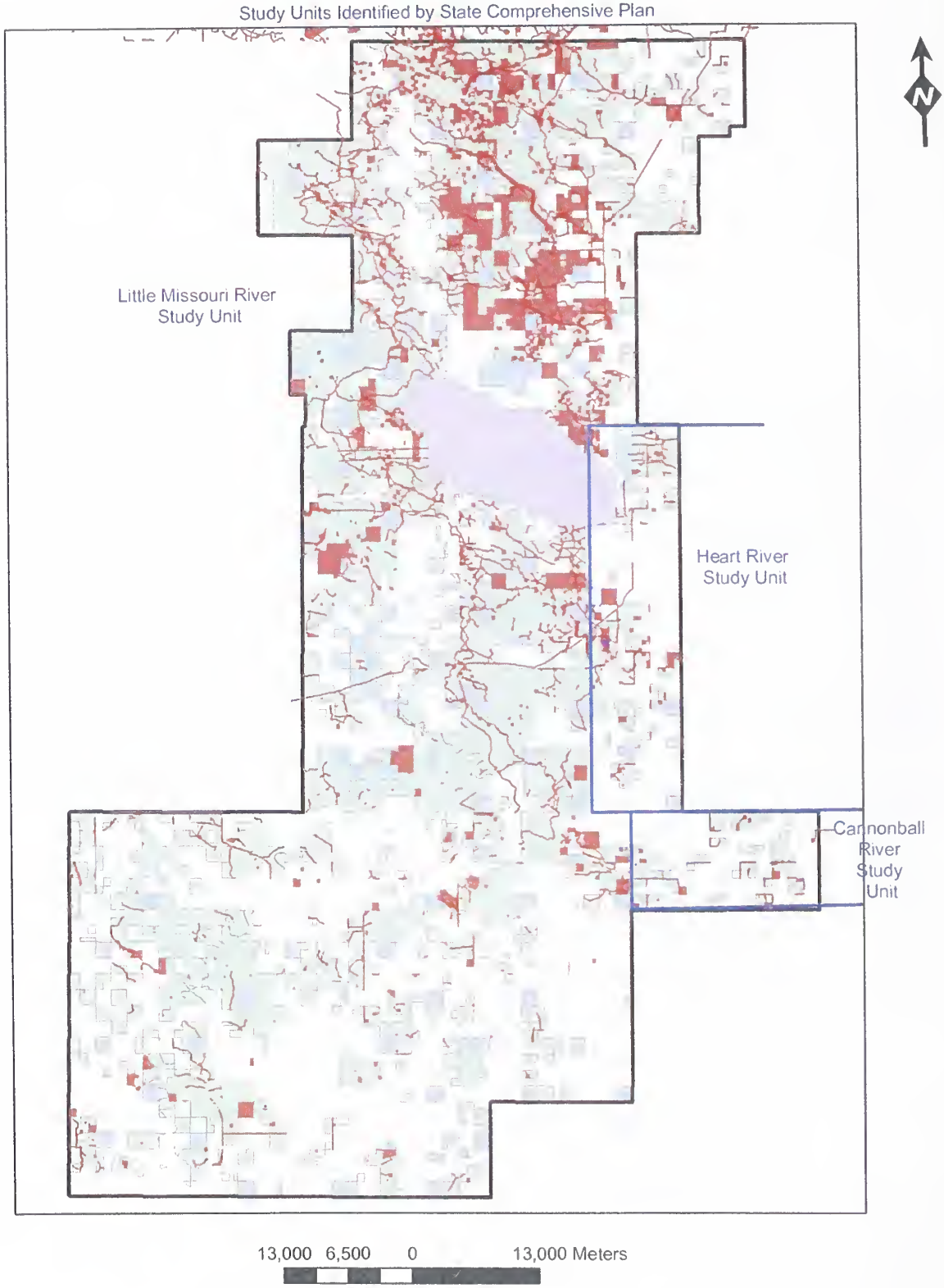
Located in southwestern North Dakota, the Little Missouri River Study Unit, or, LMR encompasses the entire drainage basin of the Little Missouri River. The Montana state line defines the research unit's western border into McKenzie County. From there it turns east along the river course to the confluence with the Missouri River in Dunn County. Included are portions of six counties for a total of 4,812 square miles. The Little Missouri National Grasslands (LMNG) covers the central portion of the study

MAP 1--Inventory Areas on McKenzie District Little Missouri National Grasslands

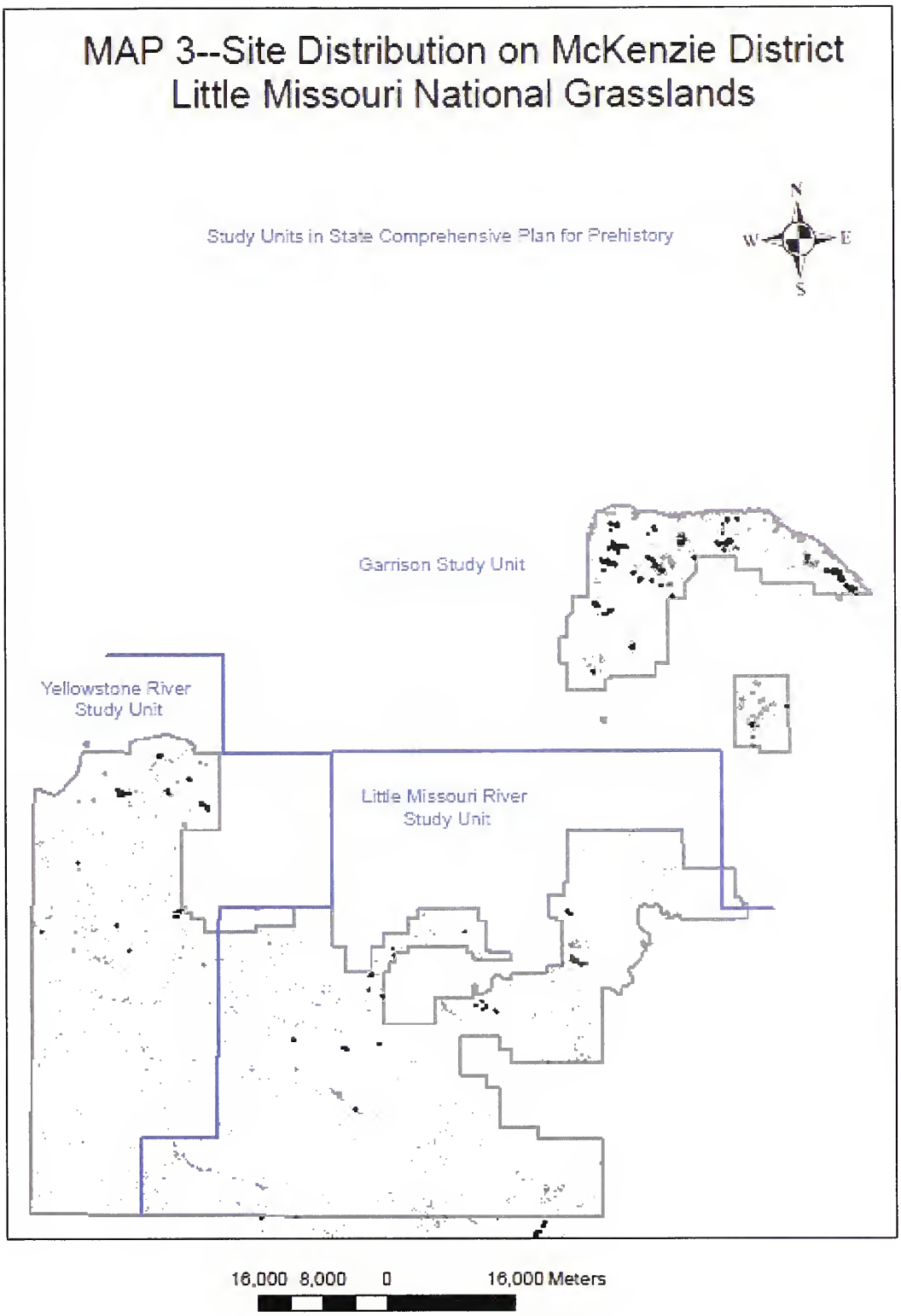


Map 2--Inventory Areas on Medora District
Little Missouri National Grasslands

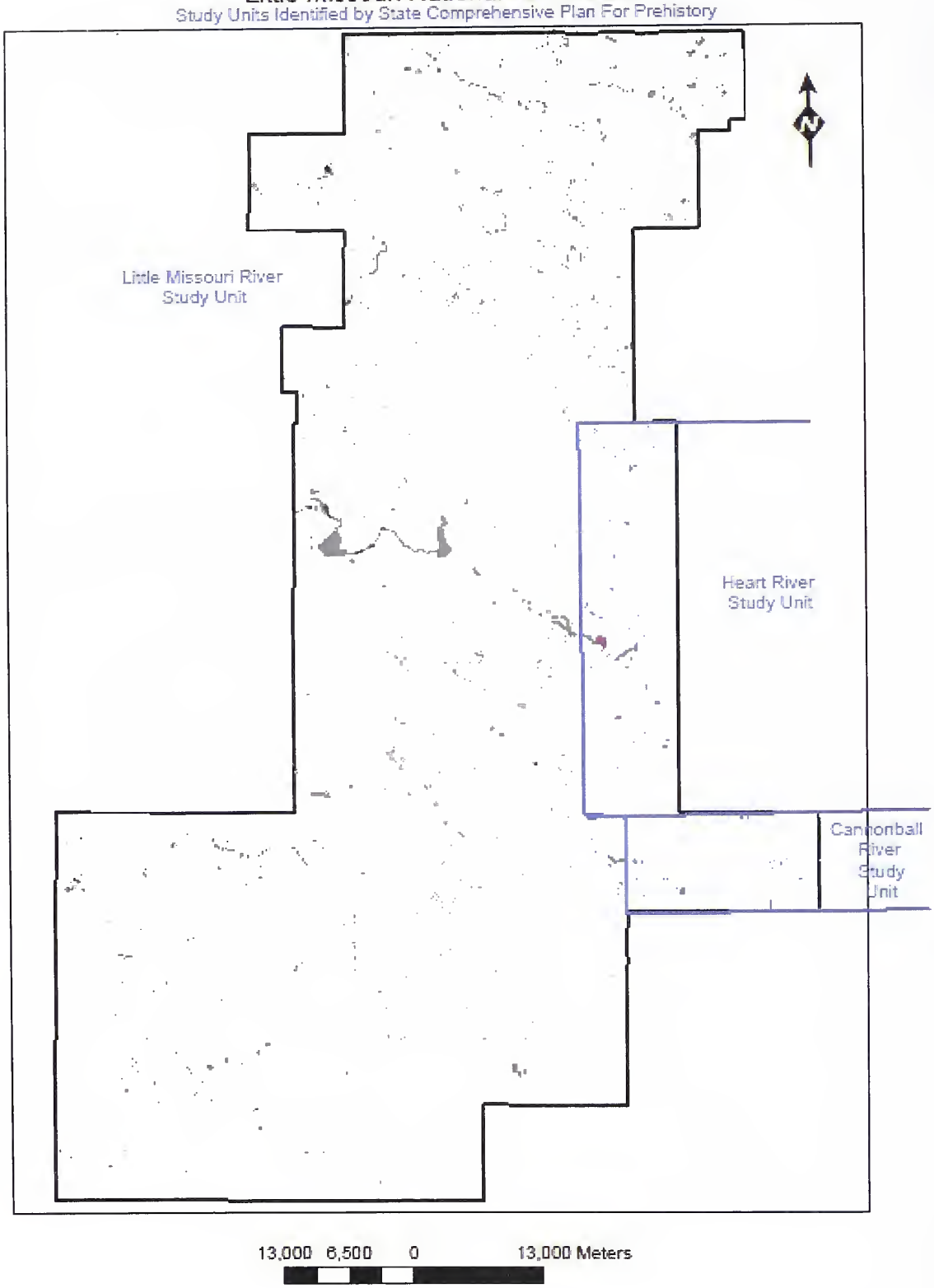
Study Units Identified by State Comprehensive Plan



MAP 3--Site Distribution on McKenzie District Little Missouri National Grasslands



MAP4--Site Distribution on Medora District
Little Missouri National Grasslands
Study Units Identified by State Comprehensive Plan For Prehistory



unit with parts in Slope, Golden Valley, Billings, and McKenzie Counties. Totaling about 818,620 acres, or about 1,279 square miles, the Little Missouri National Grasslands represent about 27% of the land area of the LMR.

Physiography

Badlands form a unique topographic region within the Missouri Plateau area of the Northern Great Plains physiographic province (Fenneman, 1931). Situated along the course of the Little Missouri River, the Badlands are rugged and deeply eroded, hilly areas characterized by 20% to 50% slopes. Local relief is commonly over 500-feet (Bluemle, 1977). Heavily dissected topography resulted from down cutting of the Little Missouri River after being diverted by glacial advances during the Pleistocene. The river then flowed over a shorter, steeper course eastward to the Missouri River. Erosional processes include slope wash, mass wasting and similar weathering processes which began in the Pleistocene and continue today. In the southern part, the river has cut down about 80 feet below pre-glacial levels and about 300 feet in the northern part. As it flows eastward toward the Missouri River, the river channel drops below 500 feet of the pre-glacial levels in some areas.

Topography consists of many large upland ridges of grass which extend into the Badlands and provided access corridors and travel routes through the rugged landscapes for both game and aboriginal peoples. Exposed in the slopes of these ridges and buttes are remnants of the Fort Union formation. Paleocene Age stratigraphy includes, from youngest to oldest, the Sentinel Butte, Bullion Creek, Slope and Ludlow formations. Their composition consists of clay, sandstone, shale, and lignite (Bluemle, 1977).

Overview Little Missouri River & Badlands Terrain

Formations contain large numbers of quality tool stone materials to include fine cherts, quartzites, and chalcedonies in the Flaxville Gravels, and cobbles of Knife River Flint in Big Plateau Gravels. Porcellanite, formed from the burning lignite layers in the clay bedrock formations, is also common. Miocene Flint is widespread on the upper buttes in the southwest part of the unit (NDCP, 1990).

Within the Little Missouri Valley, there are extended tracks of dark fertile loam soils. Soils however are generally quite thin. and exposures of pre-Pleistocene sediments cap portions of many elevated landforms. Buried top-soils from Holocene times can be found in some areas, especially on the lee sides of hills and ridges and in swales and upland areas. Much of the elevated terrain in the Badlands was stripped of early Holocene soils during the Altithermal.

The Little Missouri River flows through the center of the LMR study unit. Starting from the south and

moving north, the following is a list of major tributary streams: Deep Creek, Sand Creek, Bullion Creek, Garner Creek, Andrews Creek, Davis Creek, Blacktail Creek, Whitetail Creek, Magpie Creek, Beaver Creek, Biecicgel Creek, Dry Creek and Cherry Creek. These streams are deeply entrenched into the surrounding Badlands and often lined by cottonwoods and deciduous trees. Junipers grow on north facing ridge slopes as well as in rugged terrain. Grasslands and rolling uplands are on adjacent sides of the Badlands terrain with remnant upland ridges extending between the major valleys.

Flora and Fauna

The Little Missouri Badlands region has greater floral and faunal diversity than the surrounding plains. And much of the LMR encompasses Badlands terrain with western wheatgrass-sagebrush the dominant floral community. Sagebrush, prickly pear cactus and some grasses occur on buttes and ephemeral creek bottoms, while several perennial grasses grow on the upland prairies. Cottonwood forests grow along stretches of bottomlands in the Little Missouri Valley and juniper served as construction material for aboriginal conical timbered lodges.

During early historic times, the Badlands were home to bison, elk, pronghorn antelope, mule deer, and white-tailed deer were widespread. Wolves, coyotes, jack rabbits, and prairie dogs were also common. Many of these species can still be found in protected areas such as Theodore Roosevelt National Park. Various fish species live on the lower reaches of the Little Missouri River (NDCP, 2008:1.1-1.16).

Class III Inventory and Testing Projects

Professional archeological investigation and interest in the Little Missouri National Grasslands began in 1977. Presently 3,251 projects are on file for the LMNG portion of the Little Missouri River Study Unit with the majority Class III inventory survey reports. These survey projects inventoried 186,408 acres, or about 23% of the total land area.

More excavation and testing of sites have taken place on the LMR than any other study unit on the LMNG, with 124 reports detailing the results of testing. Projects varied in size and scope; they range from test probes to large multi-site block evaluations and mitigation. Testing reports are summarized in the following table:

Table 2: Test Excavations in the Little Missouri River Study Unit

SITE NUMBER	REASON FOR EXCAVATION	REFERENCE	DPG REPORT NUMBER
32BI40	NRHP Evaluation Mitigation for No Adverse Effect	Greer, 1979 Lau and Greer,1980	D7-79-139 D7-80-095
32BI22	Mitigation to Achieve No Adverse Effect	Simon & Loendorf, 1980 Simon and Borchert 1981	D7-80-122 D7-81-130

SITE NUMBER	REASON FOR EXCAVATION	REFERENCE	DPG REPORT NUMBER
32BI76	Test and Monitor to verify site was avoided	Greer, 1980	D7-80-126
32BI94	Test and Monitor to verify site was avoided	Rippeteau, 1980	D7-80-132
32BI130	Test to verify site avoided	Rippeteau, 1980a	D7-80-131
32BI21	NRHP Evaluation	Fox, 1980 Fox, 1980b	D7-81-19 D7-81-131
N/A	Test to verify no site	Rippeteau, 1980	D7-81-94
32BI238	NRHP Evaluation	Van Hoy, 1981	D7-81-119
32BI241 32BI242	NRHP Evaluation Test to verify site avoided	Rippeteau, 1981b	D7-81-120
32BI250	NRHP Evaluation	Rippeteau, 1981c	D7-81-135
N/A	Test to verify site absence	Rippeteau, 1981d	D7-81-139
32BI272	Shovel Test Road Salvage of Hearth	Rippeteau, 1981e	D7-81-160
32BI214	NRHP Evaluation	Rippeteau, 1981f	D7-81-214
N/A	Test gasline route	Johnson & Simon, 1981	D7-81-181
32BI272	NRHP Evaluation and Mitigation	Aivazian, 1981 Aivazian, 1981a	D7-82-22 D7-82-67
N/A	Test to verify absence of site	Rippeteau, 1981g	D7-82-23
32BI296	NRHP Evaluation	Moore, 1982	D7-82-25
32BI121 32BI249	NRHP Evaluation	Simon & Kuehn,1981 Kuehn, 1982	D7-82-42 D7-83-10
32BI298 32BI299	Shovel Test verify sites avoided	Rippeteau, 1981h	D7-82-49
32BI235 32BI258 32BI259 32BI260	NRHP Evaluation	Simon, 1982	D7-82-68
32GV52	NRHP Evaluation	Rippeteau, 1982	D7-82-72
32BI29	NRHP Evaluation	Rippeteau, 1982a	D7-82-103
32BI309 32BI310	NRHP Evaluation	Simon & Borchert, 1982	D7-82-113
N/A	Test to verify absence of site	Kuehn, 1982a	D7-82-160
32BI286 32BI312	NRHP Evaluation	Campbell, 1982	D7-82-130
N/A	Test to verify absence of site	Drybred, Kuehn, & Simon, 1982	D7-82-162
32BI286	Mitigation for No Adverse Effect	Campbell, 1983	D7-83-4
32BI273	Salvage Excavation	Borchert, Montgomery, & Simon, 1982	D7-83-5
32BI246 32BI247 32BI248 32BI249 32BI275 32BI312	NRHP Evaluation Mitigation for No Adverse Effect (Anderson Divide)	Metcalf, 1982 Simon, Sheldon & Keim, 1983	D7-83-19 D7-83-74

SITE NUMBER	REASON FOR EXCAVATION	REFERENCE	DPG REPORT NUMBER
32BI319			
32BI317	NRHP/Mitigation Monitor/Salvage	Simon & Keim, 1983 Floodman, 1987	N/A D7-87-24
32GV404	NRHP Evaluation	Borchert, Birnie, & Simon, 1983	D7-83-59
32BI332	NRHP Evaluation	Simon, 1983 Simon & Borchert, 1984	D7-83-66 D7-85-40
32BI356	Test to verify site avoided	Floodman, 1983	D7-83-67
32BI367	NRHP Evaluation	Gear, 1983	D7-83-70
32BI40	Evaluation of road effect on site	Kuehn, 1983 Kuehn, 1984	D7-84-5 D7-84-41
N/A	Test to verify absence of site	Borchert, 1984	D7-84-65
32BI359 32BI358	NRHP Evaluation	Kuehn, 1985	D7-85-84
32GV17	NRHP Evaluation	Borchert, Porsche & Kuehn, 1985 Borchert, Porsche, & Kuehn, 1987	D7-85-88 D7-87-31
32BI450	NRHP Evaluation	Christenson & Kuehn, 1986 Kuehn, 1987	D7-86-20 D7-87-30
32BI473	NRHP Evaluation	Blikre & Kuehn, 1986	D7-87-5
32BI459	NRHP Evaluation	Kuehn, 1987b	D7-87-6
32BI464 32BI465	Auger tests to evaluate road	Kuehn, 1986	D7-87-18
32BI423/ 32MZ729	NRHP Evaluation	Kuehn, 1987b Kuehn, 1987	D7-87-19 D8-87-38
32SL44	NRHP Evaluation and Mitigation	Shaw & Kuehn, 1987 Borchert & Shaw, 1987	D7-87-37 D7-88-12
32GV137	NRHP Evaluation	Shaw & Loendorf, 1987	D7-87-41
32BI131	NRHP Evaluation	Blikre & Kuehn, 1987	D7-87-42
32BI308 32BI503	NRHP Evaluation	Floodman, 1988 Floodman, 1989	D7-88-36 D7-89-39
32BI460 32BI461 32BI462 32BI463	NRHP Evaluation	Moore & Kuehn, 1988 Fox, 1989	D7-88-44 D7-89-37
32BI632	NRHP Evaluation	Borchert, 1989 Klinner & Borchert, 1990	D7-89-10 D7-91-2
32BI424	NRHP Evaluation	Kuehn, 1989 Burbidge & Borchert, 1990	D7-89-12 D7-90-57
N/A	Tests to verify absence of site	Borchert, 1989b	D7-89-27
32BI88 32BI26 32BI86 32BI140	NRHP Evaluation	LaPoint, 1989	D7-89-40

SITE NUMBER	REASON FOR EXCAVATION	REFERENCE	DPG REPORT NUMBER
32BI737 32BI738 32BI739 32BI740 32BI741	NRHP Evaluation	Wenker & Borchert, 1990 Wenker & Borchert, 1990b	D7-90-10 D7-91-3
32BI70	NRHP Evaluation	Peterson, 1989	D7-90-15
32BI720 32BI287	NRHP Evaluation Monitor/Salvage	McKibbin, 1989 McKibbin, 1989b McKibbin, 1990	D7-90-17 D7-90-23 D7-90-35
32BI753	NRHP Evaluation	Blikre, 1990	D7-90-69
32SL100	NRHP Evaluation	Borchert, Klinner, Loendorf, 1991	D7-91-44
32SL213 32SL214	NRHP Evaluation	Kurtz, 1991	D7-91-86
32GV157 32GV159	NRHP Evaluation	Christenson, 1991	D7-91-56
32BI794	NRHP Evaluation	Borchert, 1991	D7-91-60
32BI809	NRHP Evaluation	Kurtz, 1992	D7-92-73
32BI860	NRHP Evaluation	Klinner, 1997	D7-97-14
32SL218 32GV158	NRHP Evaluation	Floodman, 2001	D7-01-23
32BI249 Locality B	Fireline Salvage	Toom, 2006	D7-07-06
32BI1057	Fireline Salvage	Toom & Jackson, 2010	D7-10-14
32BI135	Salvage	Toom, In Preparation	?
32MZ422	Test to assess road effects to site	Greer, 1980a	D8-79-221
32MZ38	Test assess effect of oil construction	Greer, 1980b	D8-80-25
32MZ56	Test to assess effect of oil construction.	Greer, 1980c	D8-80-45
32MZ80	Test to assess effect of oil construction.	Greer, 1980d	D8-80-49
32MZ88	Test assess effect of oil construct.	Tate, 1980	D8-80-58
N/A	Test verify absence of site	Rippeteau, 1980b	D8-80-150
N/A	Test verify absence of site	Rippeteau, 1980c	D8-80-151
32MZ422	NRHP Evaluation of C-1	Loendorf & MacDonald, 1980 MacDonald, 1981	D8-80-176 D8-81-174
32MZ319	NRHP Evaluation	Rippeteau, 1980d	D8-80-225
32MZ38	NRHP Evaluation C-6	MacDonald & Simon, 1980 Simon & Borchert, 1981a Loendorf & Simon, 1981	D8-81-17 D8-81-284 D8-81-52
32MZ422	NRHP Evaluation C-2 to C-5	Simon & Borchert, 1981b	D8-81-208
32MZ502	NRHP Evaluation	Van Hoy, 1981b	D8-81-223
32MZ269 32MZ270	Test effect of powerline	Simon & Sheldon, 1981	D8-81-227
N/A	Test verify absence of site	Rippeteau, 1981i	D8-81-270

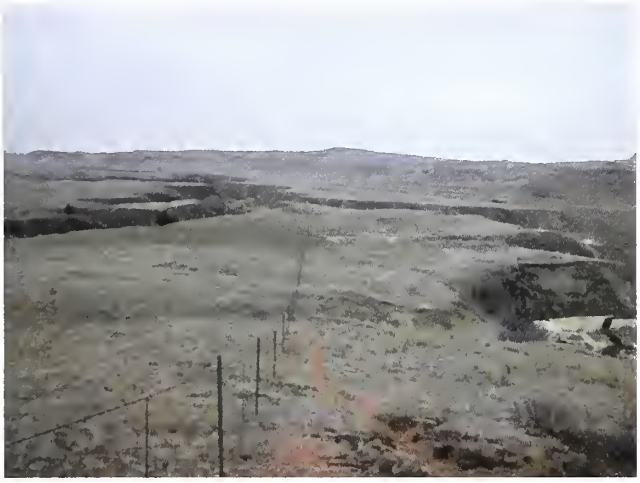
SITE NUMBER	REASON FOR EXCAVATION	REFERENCE	DPG REPORT NUMBER
32MZ224 32MZ257 32MZ258 32MZ259 32MZ260 32MZ261 32MZ319 32MZ380	NRHP Evaluation and Mitigation to achieve No Adverse Effect (Cinnamon Ridge)	East, et. al., 1981 East, et. al., 1985	D8-81-285 D8-85-70
32MZ549	NRHP Evaluation	Rippeteau, 1981j	D8-82-8
32MZ487	NRHP Evaluation and assess effect of NB Pipeline	Root, 1983	D8-82-36
32MZ422	Assess effect of pipeline to C-3 and C-5	Simon & Stanley, 1981 Simon, Drybred & Borchert, 1982	D8-82-48 D8-83-29
32MZ389 32MZ390	NRHP Evaluation assess pipeline effect	Kuehn, 1981	D8-82-52
32MZ391 32MZ393 32MZ532 32MZ537	NRHP Evaluation Assess effect of oil development (Lone Butte)	East, et. al., 1982 East, et. al., 1983	D8-82-53 D8-83-56
32MZ73	NRHP Evaluation	Moore, 1982	D8-82-80
32MZ38	C-1 Evaluation for NRHP	Simon, 1983a Simon, Dockter & Keim, 1984	D8-83-52 D8-84-44
32MZ706	NRHP Evaluation	Floodman, 1984	D8-84-56
32BI714	NRHP Evaluation	Floodman, 1985	D8-85-28
32MZ1005	NRHP Evaluation	Newberry & Olson, 1990 Newberry & Olson, 1990a	D8-90-71 D8-90-83
N/A	Test verify absence of site	Floodman, 1991	D8-91-51
32MZ1177 32MZ1184	Test verify site avoidance	Blikre & Borchert, 1993	D8-93-30
32MZ1184	NRHP Evaluation	Borchert, 1993 Borchert & Wermers, 1994	D8-93-33 D8-94-18
32MZ841	NRHP Evaluation	Klinner, 1995	D8-95-33
32MZ394	Salvage Excavation	Floodman, 1998	D8-98-05
32MZ1647 32MZ585 Isolated Find Test	NRHP Evaluation for WAPA	Hiemstra, 2006	D8-07-07
32MZ1196	NRHP Evaluation	Morrison, et al, 2008	D8-08-16

The Yellowstone River Study Unit

For the most part, the Yellowstone River Study Unit (YSR) lies in western McKenzie County with small portions extending into Golden Valley and Williams counties. Located along the east bank of the Yellowstone River, the YSR includes all areas that drain northwesterly into the Yellowstone River (up to the Montana state line), and includes 684 square miles of North Dakota (NDCP, 1990). Approximately 191,500 acres or 299 square miles of the Little Missouri National Grasslands is within the YSR study unit in western McKenzie County. This represents 44% of the land area and provides a good cross section and sample of this study unit's prehistory.

Physiography

The Yellowstone River Study Unit lies largely within the glaciated portion of the Missouri River Plateau within the Northern Great Plains physiographic province (Fenneman, 1931). The Northern Great Plains resulted from the erosion of underlying sedimentary rock. Basic topography consists of rolling plains, a few isolated buttes, as well as the more deeply eroded Badlands carved out of older bedrock surfaces. The greatest physiological relief varies from 300-feet to 500-feet with the most impressive topographic changes occurring along the edges of the Yellowstone River valley (Bluemle, 1977). Most of the area in the northern reaches has been scoured by glaciers, while the southern portion is largely unglaciated. Current landforms result from the more recent down cutting and erosion rather than Pleistocene glacial deposition. Glacial deposits are from older advances and do not greatly alter the current landscape.



Yellowstone Study Unit View

In the north end of the Yellowstone River Study Unit, glacial gravels occur in the upland areas in proximity to the confluence of the Yellowstone and Missouri rivers. Glacial till deposits overshadow parts of the north half of the unit, but most areas consist of Holocene alluvium. Throughout the prehistoric period, local gravels supplied a readily available source for stone tools. The Sentinel Butte and Bullion Creek formations make up the exposed bedrock surfaces in the Badlands. These sediments contain porcellanite and baked clay deposits used by indigenous peoples to manufacture stone tools. These include Yellowstone agate, porcellanite, chalcedonies, silicified woods, and cherts. Antelope chert was a stone resource exploited by Paleoindian and later Archaic groups in the Yellowstone River and western North Dakota. They utilized granitic, basaltic and quartzite materials to make ground stone tools.

The Yellowstone River flows in a southerly direction in the northwestern corner the study unit. It makes no contact with the Little Missouri National Grasslands and only a small portion of the river is in North Dakota. Most grasslands are found in the upland areas fronting the river breaks and located

over about a mile from the Yellowstone. Principal drainages follow a general northwesterly direction across the LMNG. Charbonneau Creek, a perennial stream, and its major tributaries begin in the north segment. The central area contains the Horse Creek and Bennie Peer Creek stream systems. The North Fork and South Fork of Smith Creek are south with their headwaters beginning in eastern Montana. Dense stands of deciduous hardwood trees border the stream systems.

Flora and Fauna

The prairie grasslands are home to a number of large and small mammals and assorted species of birds and reptiles. At one time, bison were common in the grasslands of the Northern Great Plains. Elk, pronghorn antelope and bighorn sheep also frequented the Yellowstone basin. Smaller mammals include the coyote and the white-tailed jackrabbit. Golden eagles and various species of hawks and owls are predators above the prairie. The prairie rattler and the bull snake are common. Forested bottomlands are home to mule deer along with beaver and raccoon. An assortment of fish and freshwater mussels inhabit the Missouri and Yellowstone rivers and their tributaries. Plains Indians exploited many of these creatures for hides, furs, and feathers. Modification of shell and bone material produced various utilitarian tools and ornaments. They used wood for construction material and fuel (NDCP, 2008:13.1-13.7).

Class III Inventory and Testing Projects

Professional archeological investigations began in 1977 just before the first boom in oil and gas exploration beginning 1979. Pace of archeological inventory survey increased considerably in the early 1980s, particularly in the MonDak oilfield. Eight-hundred sixty-six projects are on file with the majority requiring Class III inventory surveys. Reports document an inventory of 43,736 acres, or 23%, whereas 17 reports detail results of test excavations.

Table 3: Test Excavations in the Yellowstone River Study Unit

SITE	REASON FOR EXCAVATION	REFERENCE	DPG REPORT NUMBER
N/A	Backhoe test in Deep alluvium	Metcalf, 1979	D8-79-147
32MZ34 32MZ35	NRHP Evaluation	Metcalf, 1979a	D8-79-171
N/A	Test Isolate for subsurface Site	Savini, 1979	D8-79-190
32MZ188	Test to verify road avoided site	Tate, 1980a	D8-80-97
32MZ185	Test to verify site was avoided	Rippeteau, 1980e	D8-80-182
32MZ189	NRHP Evaluation	Rippeteau, 1980f	D8-80-193
N/A	Pad tested verify absence of site	Rippeteau, 1980g	D8-80-242
32MZ547 32MZ86	NRHP Evaluation and to verify site was avoided	Rippeteau, 1981k	D8-82-2
32MZ333 32MZ334, 32MZ573	NRHP Evaluation	Borchert, et. al., 1982	D8-82-97

SITE	REASON FOR EXCAVATION	REFERENCE	DPG REPORT NUMBER
32MZ333 32MZ334	Mitigation to achieve No Adverse Effect	Floodman, et. al., 1982	D8-82-98
32MZ685 32MZ46	NRHP Evaluation	Floodman, 1983a Floodman, 1984a	D8-84-13 D8-84-28
32MZ153	NRHP Evaluation	Kuehn, 1985a	D8-85-57
32MZ767	Salvage and Monitor of site const.	Kuehn, 1985b	D8-86-17
32MZ864	NRHP Evaluation	Borchert & Kuehn, 1988 Borchert, 1989c	D8-88-60 D8-89-10
32MZ1303	Salvage Excavation	Floodman, 1998	D8-98-5

All sites tested and evaluated, with the exception one historic site 32MZ573, were prehistoric (Borchert, et. al. 1982). Minerals related development projects initiated most of site testing projects with only one completed for a proposed county road construction.

The Garrison Study Unit

Overview in Blue Buttes of Garrison Study Unit

Found within the northwestern corner of North Dakota, the Garrison Study Unit (GA) consists of part of the Missouri River region which lies upriver, or west, of the Garrison Dam to the Montana state line. It includes portions of eight counties and covers an area of 7,995 square miles of North Dakota (NDCP, 1990). The Little Missouri National Grasslands is on its western edge in the northeastern corner of in McKenzie County. Federal lands total 57,200 acres, or about 89 square miles and represent only about 1% of the total GA. Three areas make up the Little Missouri National Grasslands portion in McKenzie County. The largest block is adjacent to the Missouri River trench in the northeastern corner of the county. This piece totals 47,490 acres, or about 83% of the land area. The second block consists of the Blue Buttes with 8,110 acres comprising 14% of the area; the remaining portion is found in T149N R95W and includes a 1,600 acre area, or 3%. All are within McKenzie County.

Physiography

The Garrison Study Unit is within glaciated portion of the Missouri River (Fenneman, 1931). Basie physiography consists of rolling plains with a few isolated buttes and minor, more deeply eroded Badlands. Again, glacial deposits do not greatly alter pre-existing landforms. Scattered cobbles and larger boulders identify the earliest glacial activity. The area is much different from the vast till plains north of the Missouri River. These were glaciated more recently and exhibit till cover of much greater depth (Bluemle, 1977).

Continuing erosion of the Missouri Plateau created a gently rolling upland environment with ridges and buttes separated by a series of drainages or valleys. Higher hills and buttes result from differential weathering and most often capped by erosion resistant materials, such as sandstone, petrified wood, dense scoria or baked clay. Due to the erosion resistant caps sandstone and scoria, Blue Buttes stands in stark relief compared to the surrounding rolling plains.

Tobacco Garden Creek, the main north flowing stream system in the GA, forms the western border of the Little Missouri National Grasslands. Clear Creek, a perennial tributary, follows a westerly direction while the intermittent Sand Creek trends to the west-northwest. Antelope Creek runs easterly across the northern part of the unit, and Bear Den Creek flows northeasterly across the southern edge. Other smaller named creek systems are part of these main stream systems. Topography along the edges and breaks of these valleys is often rugged and steep. Valley bottoms typically contain thick groves of deciduous trees.

Climate

Climate is northern continental with warm summers and cold winters. Mercer County temperatures have reached 108°F during summer hot spells and have fallen to - 48° F during winter. Average winter temperature is 12°F, while the summer mean hovers around 67°F. Precipitation is around 16 inches annually, most of which occurring during the spring and summer. Prevailing west-northwest winds average around 13 mph with brief periods of stronger winds gusting to 35 to 40 mph.

Landforms and Soils

The Study Unit consists of glaciated uplands, breaks in terrain, valley wall side-slopes and foot-slopes, draws (or coulees), alluvial terraces, and floodplains in the Missouri bottomlands and some of the larger tributaries. Archeological sites are found within all of the above landforms.

Flora and Fauna

The GA lies within the Northern Temperate Grassland biome with semiarid climate resulting in a mixed grass prairie dominated by blue grama, needle-and-thread, and western wheatgrass. This grassland provided good habitat for bison and pronghorns. Forests along the Missouri River floodplain were home to white-tailed deer and small mammals such as otters and porcupines. Transition zones between the grasslands and floodplain forests offered additional habitat diversity.

Initially cottonwoods, box elder, elm, and willows made up floodplain overstory, with oak and ash coming in later. Chokecherry, buffaloberry, gooseberry, and serviceberry are also found there and were once collected by hunter-gatherers (NDCP, 2008: 6.1–6.8).

Class III Inventory and Testing Projects

295 survey projects are on file for US Forest Service land within the Garrison Study Unit. Again, most documented projects are Class III inventory surveys covering 15,533 acres or 27%. Testing and excavation occurred at 17 sites and generated 23 project reports listed in following table:

Table 4: Test Excavations at the Garrison Study Unit

SITE NUMBER	REASON FOR EXCAVATION	REFERENCE	DPG REPORT NUMBER
32MZ144	NRHP Evaluation	Borchert, et. al., 1982	D8-82-86
32MZ173	NRHP Evaluation	Floodman, 1984b Floodman, 1985a	D8-84-49 D8-85-69
32MZ174	NRHP Evaluation	Floodman, 1984c	D8-85-23
32MZ233	NRHP Evaluation; Mitigation for No Adverse Effect	Floodman, 1985a	D8-85-69
32MZ278	NRHP Evaluation	Penny & Larson, 1985	D8-85-71
32MZ679	NRHP Evaluation; Mitigation for No Adverse Effect	Metcalf, 1987 Olson, 1992 Olson, 1992a	D8-87-39 D8-92-51 D8-93-14
32MZ675	NRHP Evaluation	Borchert & Simon, 1983	D8-83-05
32MZ669	NRHP Evaluation	Metcalf, 1987	D8-87-39
32MZ721	NRHP Evaluation; Mitigation for No Adverse Effect	Floodman, 1985b Floodman, 1986 Floodman, 1987a Floodman, 1988a	D8-85-59 D8-86-18 D8-87-40 D8-88-74
32MZ727	NRHP Evaluation	Floodman, 1986a	D8-86-23
32MZ732	NRHP Evaluation	Floodman, 1995 Floodman, 1996 Floodman, 1997	D8-95-14 D8-96-01 D8-97-01
32MZ839	NRHP Evaluation	Shaw & Kuehn, 1987a	D8-87-33
32MZ1474 32MZ1475	NRHP Evaluation	Floodman, 2001a	D8-01-05
32MZ1353	NRHP Evaluation	Jackson, et al, 2005	D8-06-04
32MZ278 32MZ733	Shovel Probes for Water Pipeline	Morrison, 2010	D8-10-43

Of the sites requiring evaluative testing prior to county road construction, 32MZ144 and 32MZ839 were historic homestead sites determined ineligible to the NRHP. One other historic homestead 32MZ732 was tested as part of a Passport-In-Time project. It contained a prehistoric lithic scatter and was deemed eligible for the Nation Register of Historic Places. All other sites tested were prehistoric in nature.

The Heart River Study Unit

The Heart River Study Unit (HR) is within west-central North Dakota centering on the Heart River. Headwaters begin near Fryburg and join the Missouri River at Mandan. Portions of five counties covering 3,348 square miles make up the HR (NDCP, 1990). Forest Service administered land borders the western edge along the divide between the Heart River and Little Missouri River Divide. Federal ownership is scattered throughout four townships. Approximately 25,240 acres or about 1.2% of the HR land area is managed by the Forest Service. Minimal archeological fieldwork has taken place within the HR and little is known of the area's past culture.

Physiography

The Heart River Study Unit covers both glaciated and unglaciated sections of the Missouri Plateau (Fenneman, 1931). The Little Missouri National Grasslands portion, near the headwaters of the Heart River, is unglaciated and for the most part has rolling prairie of low relief. Along major drainages, underlying bedrock consists of the Sentinel Butte Formation eroded to a more Badlands type topography. Isolated small buttes and ridges of relatively low physiographic relief are common.

Major eastern trending streams include the Heart River, South Fork of the Heart River, Norwegian Creek and Bull Creek. Alternatively, Government Creek, Paddock Creek, Davis Creek and Third Creek flow west into and are part of the Little Missouri River system.

Climate

Precipitation averages 15 inches per year. The eastern portion of the study unit near the Missouri River usually gets more moisture than the western portion near the Badlands. The mean annual temperature is 41°F.

Landforms and Soils

Uplands and bottomlands soils consist of a variety of silt, clay and sandy loams. Parent materials are predominantly shale, sandstone, and glacial till.

Flora and Fauna

Indian breadroot, is common on the prairie grasslands, whereas, chokecherry, juneberry, buffaloberry, and gooseberry grow in sheltered areas. Rivers, creeks and hardwood draws support cottonwood, box elder, green ash, American elm, and burr oak, with Rocky Mountain red cedar populating the more rugged areas.

Bison herds once covered the Heart River drainage; elk and other creatures were widespread. Today the only ungulates are deer and antelope. Wooded bottomlands of stream valleys were home to beavers, raccoons, and other fur bearers. The Heart River and its tributaries contain numerous fish species along with freshwater mussels. Many of these floral and faunal resources were exploited by Native American groups.

Other Natural Resource Potential

This HR contains outcroppings of good quality Tongue River silicified sediment with other knappable material such as chalcedonies and silicified woods found in gravelly surface deposits. Remains of lithic workshops occur at many locations within the HR (NDCP, 1990: 4.1–4.5).

Class III Inventory and Testing Projects

Archeological investigations on agency lands of the Heart River Study Unit began in 1979 and 149 Class III inventories have taken place. Project reports cover 6,221 acres, or 25% of the HR. On file is one shovel test report, D7-79-144, conducted by Lahren (1979) for the Conoco Federal Saddle 2-1 Well. Testing results were negative. No other formal test excavation projects have taken place in this area (NDCP, 2008).

The Cannonball River Study Unit

The Cannonball River Study Unit (CR) is found within the south and west corner of North Dakota and covers portions of six counties or 4,248 square miles (NDCP, 1990). About 12,440 acres or .4% of the study unit are within the Little Missouri National Grasslands. It is located in the northwestern corner of the unit. These federal lands are located in Slope County. The entire Cedar River National Grasslands (CRNG) is within the borders of the Cannonball River Study Unit. Federal lands total 6,680 acres or about .2% of the CR and are widely scattered across 12 townships in Sioux and Grant Counties. Archaeologists conducted little work in the area and consequently have made few contributions to the understanding of the area's prehistory.

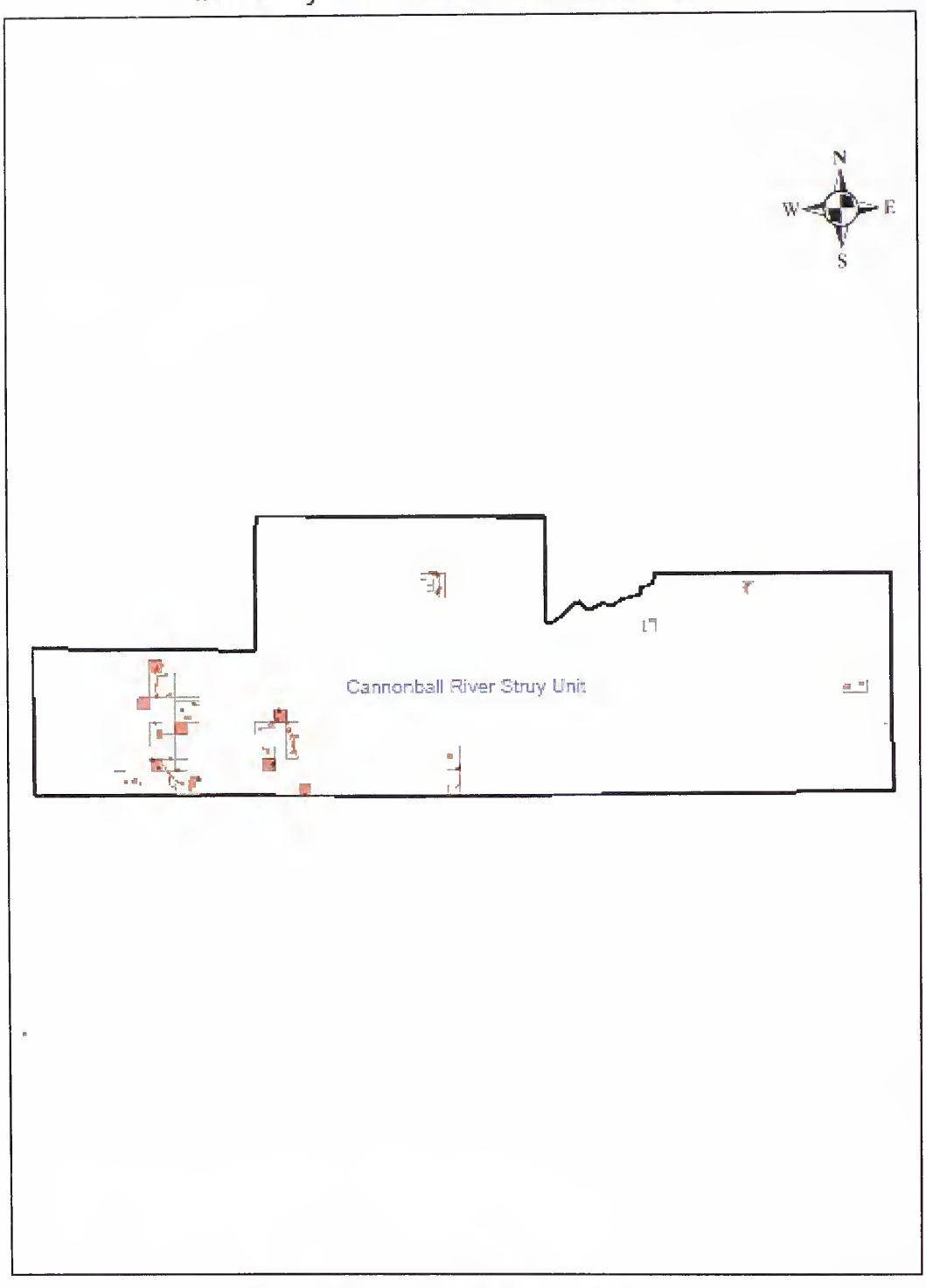
Physiography

The western part of the Cannonball River basin consists of a rugged, dissected plateau with many prominent buttes. Bullion Butte, Ludlow, Cannonball and Slope make up the bedrock formations. Elevated plateaus and buttes in the west are often capped by sandstone, whereas in the east they are capped by Tongue River Silicified Sediment (TRSS) or sandstone. Native Americans found outcrops of knappable tool stone including Rainy Buttes Silicified Wood, TRSS, agatized wood, chalcedony, and quartzites in the area. Today, most of the former agricultural fields are now planted in crested wheat grass.

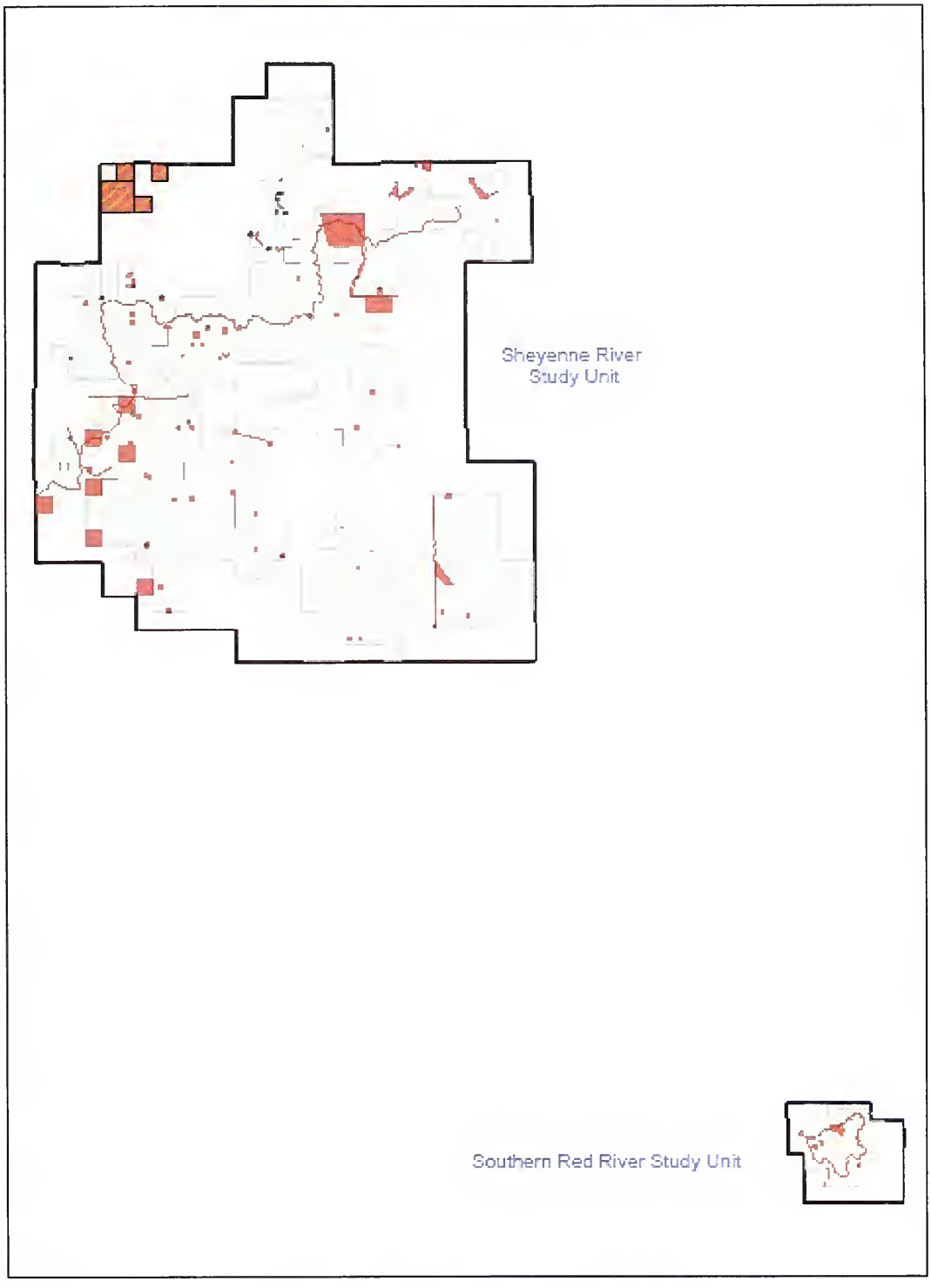
View Cedar River National Grassland

The entire 295 miles length of the Cannonball River is included in the study unit. Headwaters are in eastern Slope County and the river's confluence is at the Missouri River. The main drainages are the Cannonball River in the north and Cedar River to the south. Topography is basically one of rolling prairie. South of Cedar River and interspaced among federal lands is the Turtle, Hay, Plum and Roger Creek ephemeral streams. The South Fork of the Cannonball River and Philbrick Creek are the largest drainages in the western portion.

Map 5–Cedar River National Grassland
Inventory Areas and Site Distribution



Map 6–Sheyenne National Grassland
Inventory Areas and Site Distribution



Climate

Annual precipitation is about 15 inches with 10 inches falling in May through September. The eastern portion of the unit shares the distinction of having the highest annual mean temperature with the extreme southeastern and southwestern corners of the state.

Landforms and Soils

Soils developed primarily from sediments of the Slope, Bullion Creek, and Sentinel Butte formations.

Flora and Fauna

Most of the area is grasslands, with some trees such as cottonwoods in riparian zones along the lower reaches of the Cannonball River and tributaries. Trees are also found adjacent to springs. The prairie grasslands is a mixed grass grama-needle and thread grass ecosystem. Indian breadroot is common on the prairie. American elm, box elder, green ash, juneberry and chokecherry, and buffalo berry are in some of the draws and coulees. Bison, elk, mule deer, pronghorn antelope, wolf, coyote, jack-rabbit, prairie dog, badger, golden eagle, and the prairie chicken once inhabited the region.

Other Natural Resource Potential

Most of the streams are nearly dry in summer, except after rain storms, but springs are found on the valley side slopes and on the sides of buttes. Spring locations are small spots of biotic diversity which should have been regularly exploited by hunter-gatherers.

Rainy Buttes silicified wood (RBSW) is a very distinctive dark reddish brown cryptocrystalline stone with the only known source area at the headwaters of Coal Bank Creek and Chantapeta Creek. RBSW is found in gravel deposits on hills and low rises around the Rainy Buttes. Evidence for prehistoric procurement and workshop activities is common in these areas. This material was originally called waxy brown chert (NDCP, 1990:2.1–2.5).

Class III Inventory and Testing Projects

On the Cannonball River Study Unit, archeological field work commenced in 1979. However, as in some other units, lack of oil and gas exploration activities resulted in little in the form of archaeological pedestrian survey and testing. Fifty-three Class III inventory projects are on file for the Little Missouri National Grasslands portion for an aggregate of 2,550 acre, or 20% of its CR. On the CRNG, professionals conducted 15 Class III inventory projects on 1,712 acres or 25% of its portion of the CR. No formal testing has been done to date.

The Sheyenne River Study Unit

The Sheyenne River Study Unit (SR) is in eastern and southeastern North Dakota and encompasses the drainage basin of the Sheyenne River and the Devils Lake. The SR contains portions of 18 counties covering 11,016 square miles (NDCP, 1990). The Sheyenne National Grasslands (SNG) is in the southeastern portion of the study unit and includes parts of Ransom and Richland counties and represents less than 1% of the SR land area. A separate 2,920-acre parcel near Hankinson, North

Dakota, south of the Wild Rice River is within the South Red River Study Unit. The tract has no recorded prehistoric sites and very little in the way of previous cultural resource inventory and evaluation. Therefore, for purposes of this document, the entire Sheyenne National Grasslands is lumped into the SR.

View of Sheyenne National Grasslands

Physiography

The Sheyenne National Grasslands is within the Red River Valley physiographic zone (Bluemle, 1979). Sedimentation of glacial Lake Agassiz resulted in a relatively featureless plain. The area is flat with only minor topographic relief except where major drainages have downcut into surrounding glacial lake bed plain. The area is part of a mixed/tall grass prairie ecosystem.

Predominant physiography is one of gently rounded, sloping to moderately steep and irregular sand dunes. These sandy soils formed as the Sheyenne River emptied into Lake Agassiz creating the Sheyenne Delta. Glacial melt water scoured the original watercourse making the present Sheyenne River Valley today considerably larger than the river. Lake Agassiz was created about 11500 BP and emptied out for the last time about 9500 to 9200 BP. The Sheyenne River then extended its course to the northeast carving its modern route to the Red River. Freshwater springs presented another water source for game animals and aboriginal use. The SNG has very few free flowing streams. The Sheyenne River cuts through the northern portion of the Ranger District and the majority of grasslands are on the south side of the river valley. Native vegetation consists of tall grass species. As a result of farming and homestead activity, trees originally confined to the river valley such as aspen, cottonwoods, willow, elm and basswood are becoming established on the upper prairie. Four episodes of soil development correlate temporally with the Late Plains Archaic-Middle Plains Woodland occupations dated between AD 1 and AD 500. A fifth soil strata compares with the mesic climatic conditions of early Plains Village.

Climate

All of North Dakota has sub-humid continental climate characterized by wind and extreme temperatures. Winters are long and cold, while summers are short with warm to hot temperatures and sub-humid conditions. In Ramsey County, average winter temperature is 8°F, while summer temperature average 67°F. Total annual precipitation is 16.6 inches with 75% usually falling in the months of April through September. Average seasonal snowfall is ca. 37 inches.

Landforms and Soils

The primary landforms in the Sheyenne River Study Unit include floodplains, terraces, beach ridges, valley walls, alluvial/colluvial fans, and upland plains. Soils found on these landforms formed under a variety of pedogenic factors.

Flora and Fauna

Drift Prairie is dominated by tall grasses with some wooded areas on portions of the Sheyenne's older

terraces, valley slopes, and floodplain. Marsh wetlands are present in the vicinity of upland small lakes and ponds. Tall grasses are the dominant native plant species of the prairie (NDCP, 2008: 12.1–12.6).

Class III Inventory and Testing Projects

Archeological research on the Sheyenne National Grasslands began sporadically in 1979 and continues today in response to proposed ground disturbing practices. This tall grass prairie is among the least studied. Beckes and Keyser (1983) summarized the early work in the area. 77 projects are on file at the district office documenting 5,465 acres surveyed on Federal land.

District Archaeologist Walt Allen (1984) conducted a systematic coring of a large sand dune believed to be a burial mound and was subsequently recorded as site 32RM97. He completed one other test project on the Sheyenne District in 1983, excavating test units and drawing profiles at 32RM16, a river terrace site. This material was summarized in a professional paper (Allen 1984a).

The Grand/Moreau Tablelands Archeological Region #2

The Grand River National Grassland (GRNG) covers 155,000 acres within parts of Corson, Perkins, and Ziebach counties in north-central South Dakota. Winham and Hannus (1990) placed the GRNG within the Archeological Region #2: The Grand/Moreau Tablelands (G/MT). This area consists of the Grand and Moreau River drainage basins located in the northern stretches within the Grand River watershed. The GRNG represents a very small portion of the total G/MT study unit.

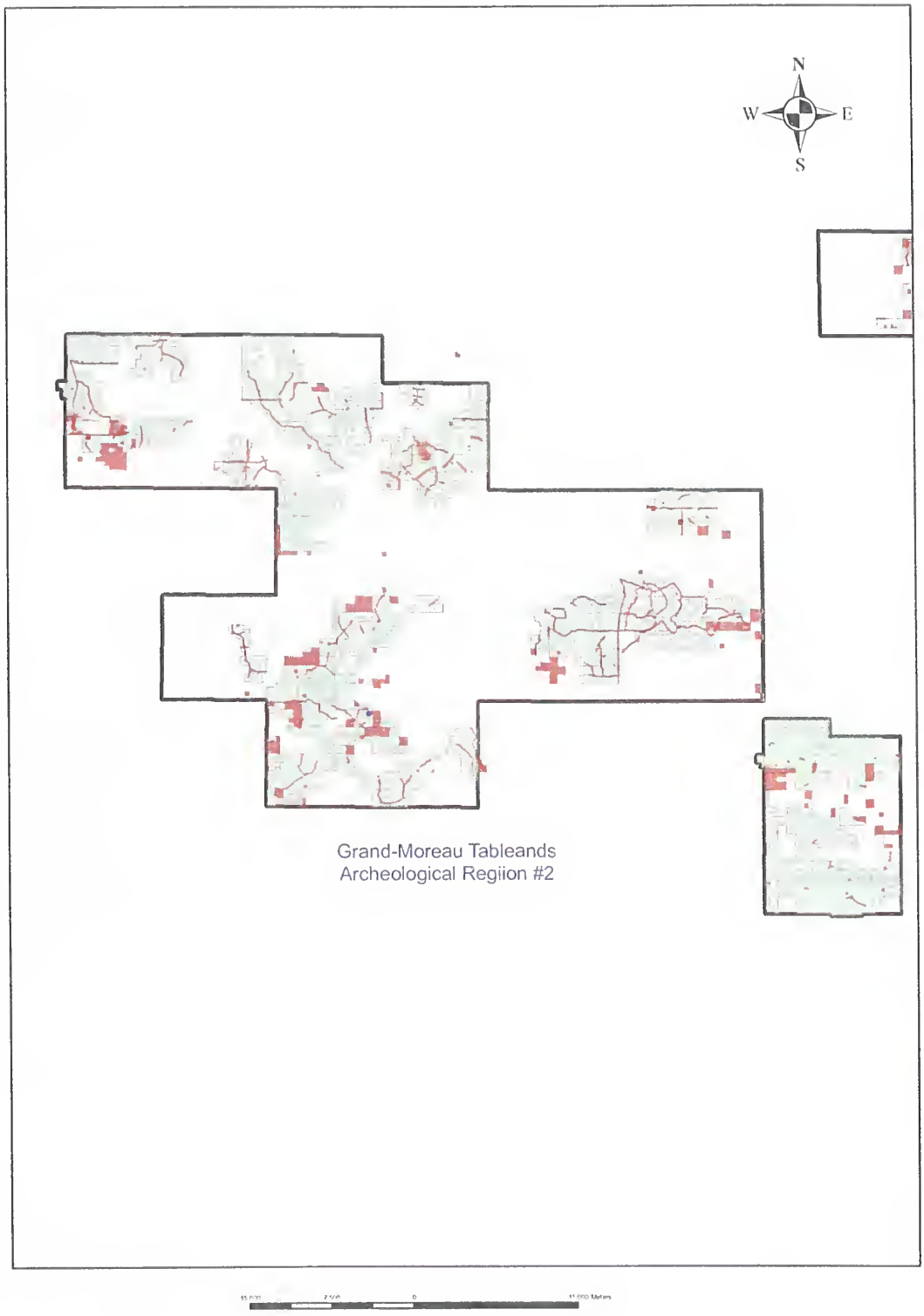
Physiography

The following is summarized from Beckes and Keyser (1983). Physiographically, undulating mixed grass prairie makes up about 85% of the GRNG. It is broken by occasional, isolated high buttes, such as White Butte, and by the broad and shallow valleys of the North Fork and South Fork of the Grand River. Elevations range from 2,400 to 2,900 feet. Eroded valley edges expose tertiary clay bedrock that has turned into minor Badlands topography in some areas.

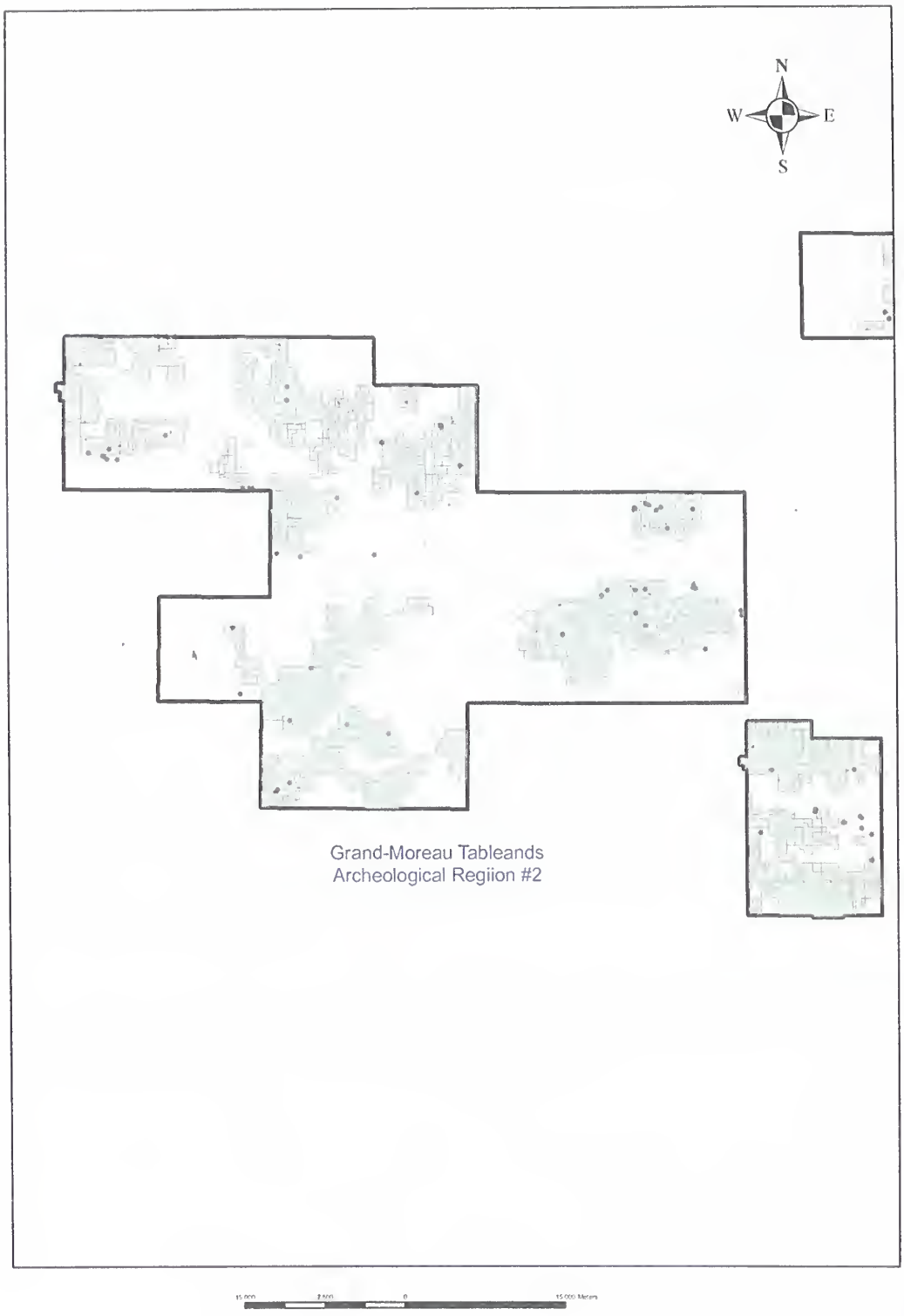
Underlying bedrock includes the Fort Union, Cannonball, and Ludlow formations of Paleocene Epoch; lower elevations in Perkins and Corson counties are the Upper Cretaceous Hell Creek formation. Soils are shallow, sandy to sandy clay loams highly susceptible to erosion.

Tongue River silicified sediment (TRSS), porcellanite, and many varieties of agatized wood are the knappable stones found here. TRSS often occurs as a dense surface lag deposit of large angular boulders scattered across hill tops and stream terraces. Agatized wood carpets many of the low hills and ridges in the Bowman-Haley Reservoir locality. It is necessary to compile specific information about the source areas of various materials to determine if any high-grade porcellanite is present. Underground lignite burns forming porcellanite, and several below surface burns occurred in Adams County in the mid-1900s. Lithic resources of this Study Unit are more abundant than those in the eastern and northern parts of the state.

Map 7--Inventory Areas on Grand River National Grassland



Map 8--Site Distribution on Grand River National Grassland



The Grand River National Grasslands, the climate is described as semiarid or sub-humid continental. Rainfall averages 16 inches per year, but periodic droughts render this data somewhat unreliable. The driest time of the year typically is winter. Soil usually freezes prior to significant saturation and is usually blown bare of snow by high winter winds.

View in Grand River National Grasslands

Flora and Fauna

Hardwoods and substantial riparian areas are found along the river courses and main tributary systems. Four ecosystems are present: mixed short grass prairie (85%), dissected Badlands (8%), isolated sandstone buttes (5%) and hardwood draws (2%). The region has a high carrying capacity with diverse flora and fauna species indicating a high potential for cultural habitation in the prehistoric past (NDCP, 2008: 8.1–8.7).

Class III Inventory and Testing Projects

Previous archeological work within the district boundary began in 1977. Hannus and Winham (1990), report the area has great archeological potential. But like some of the others, the Grand/Moreau Tablelands has not seen much archeological survey and research. The exact nature of the area and the questions to be addressed are not yet fully developed. A total of 178 projects are in the database and files of the Grand River District. These surveys inventoried a total of 21,478 acres, or 14% of the entire area of the GRNG. The following project reports detail the results of test excavations for the purpose of evaluating sites for the NRHP prior to large land exchanges.

Table 5: Test Excavations of the Grand/Moreau Tableland Archaeological Region #2

SITE NUMBER	REASON FOR EXCAVATION	REFERENCE	DPG REPORT NO.
39CO157 39CO158 39CO159 39CO160 39CO161 39CO162 39CO163 39CO164 39CO165 39PE182	NRHP Evaluation	Floodman, Kurtz, LaPoint, 1994	D6-94-1
39PE183 39PE184	NRHP Evaluation	Kurtz, 1994	D6-94-6
39PE201 39PE202 39PE204 39PE205	NRHP Evaluation	Kurtz, 1996	D6-96-1

Dakota Prairie Grasslands Prehistoric Sites

Class III cultural resource inventories resulted in the location and recordation of 2,404 sites within the Dakota Prairie Grasslands. Overall site density for the Dakota Prairie is one site per 117-acres of inventory. Of these sites, 1,775 have prehistoric cultural components representing 74% of the total site records. Prehistoric site density over the entire area is one site per 160-acres of inventory. The remaining 629 are historic component sites and not part of the analysis.

Below is a brief discussion of the 16 prehistoric sites types used in the analysis and also comparisons between study units and national grasslands. In some instances site types overlap, for example lithic scatters may have associated cairns, hearths and other cultural material, or stone circles that are often associated with cairns. With multiple features, the main component identifies the site type.

1. Cultural Material Scatters (CM) is the largest category with 1,154 identified sites representing 65% of the total. CM scatters may contain surface exposures of lithics, bone, ceramics, fire-cracked rock (FCR), exposed hearths and stone tools. We believe prehistoric peoples used these sites for short to long terms and/or habitation. A majority are on upper hills, buttes and ridges and occasionally on terraces. CM makes up the preponderance of site types on all study units except the GA. Ceramics are not common among the assemblages. Hearths are occasionally present, usually discovered eroding out of banks or during excavations.

32SL332 Eroding Hearth and Paleosols

2. Stone circles, or tipi rings, are the second most common site type with 289 (16%) recorded. Stones were generally used as weights to hold down tipi covers or line the interiors of conical hide lodges. Stone circles are ubiquitous to all of the North American Great Plains. Surface visibility is often obscured by grass and other vegetation making smaller artifacts difficult to recognize. Stone circles represent 59% of the recorded sites on the Garrison Study Unit.

- Single stone features - 102 sites, (35%)
- 2 to 10 stone features - 159 sites, (55%)
- 11 to 20 stone features - 17 sites, (6%);
- 20+ features 11 sites, (4%)

3. Rock Cairns consist of clustered or piled stones, often found on high hill tops or in open, highly visible areas. Overall, cairns are not well understood and their origins and functions are largely unknown. Some evidently functioned as burial markers or caps. Archaeologists recorded 169 sites (10%) as rock cairns or multiple rock cairns. These features are a common component (26%) at many stone circle and CM sites.

4. Eagle Trapping Pits are subsurface blinds used to conceal the hunters of bald eagles and golden eagles. Archaeologists recorded the sites on the upper bluffs of the Little Missouri, Yellowstone and Missouri rivers. These pits are found on the west-facing edge of ridges and provided excellent views of the surrounding areas. Most are concentrated on the LMR with fewer noted in the YSR and Garrison Study Unit. Over the years, field crews recorded 69 eagle trapping pits (4%).

32MZ1576 Pit Location

5. Quarry/Lithic Procurement Sites are source areas for obtaining suitable stone tool manufacturing material. Tool stone found in outcrops, local gravels as well as areas of baked clay porcellanite, are common across the units. In the Yellowstone River Study Unit, archaeologists recorded 35 (2%) generally small quarry sites utilizing local gravels. The YSR also contains the large Antelope Chert procurement quarry. Several porcellanite quarries are present in the Little Missouri River Study Unit.

6. Bison Kill/Processing Sites usually contain small concentrations of bison bone found eroding out of a coulee or deep washes. In most instances, no cultural material is associated with these beds. Fourteen sites, (<1%), contain small amounts of bison bone; however, archaeologists have yet to discover a large bison bone bed. Several previously sites recorded as "kill areas" are not relocatable, having eroded and washed away. Bison Kill/Processing Sites are largely concentrated in the YSR and LMR with single finds in the Heart River Study Unit and Grand/Moreau Tablelands Study Unit. Natural elements such as extremely cold winters that killed animals may have created some of these sites.

32MZ435 Winter Wickiup Lodge

7. Conical Timbered Lodges are ceremonial structures associated with the eagle trapping. They are relatively rare with seven known sites located on the LMNG. The sites are usually single features, although two lodges are present at one site. These lodges vary considerably in preservation and Allen (1983) estimated they date after AD 1880. One consists of a lone depression with the timbered poles washed away in a historic era flood. Researchers associate eagle trapping complexes and lodges with the Mandan and

Hidatsa. Five of the lodges are on private land with their associated eagle trapping pits located on the Little Missouri Grasslands.

8. Hearths, made up of concentrations of fire cracked rock (FCR), are found on the Little Missouri River Study Unit. Eroded and deflated on the surface, these hearth feature sites have no associated lithics or other cultural materials. All of the seven recorded hearths appear to have little National Register of Historic Places eligibility potential unless yet to be uncovered, subsurface materials are present.

9. Vision Quest Sites are usually on the crest of tall buttes in wide open or prominent areas such as Bullion Butte and Blue Buttes. They consist of stacked rocks in rectangular or horseshoe shapes used for fasting and questing for visions. The DPG has seven recorded vision quest sites.

10. Prehistoric Rock Art Sites are etched or painted figures found on sandstone outcrops and bluffs. Prehistoric rock art is very rare on the DPG with only five known sites: a thunderbird effigy, tally marks and vulva-form on the LMR and a geometric pattern and a human face on the Garrison Study Unit. Most grasslands' rock art is historic graffiti consisting of names and dates.

Vulvaform at 32BI845

11. Patterned Cairn Sites consist of large sites with numerous rock cairn formations dotted over the crest of the hills and ridges. Three sites are currently known to be on the YSR and one in the Garrison Study Unit. One site has 169 rock cairn features and the others have 62 rock cairns, 90 cairns and 120 rock cairn features. Origin and function of these site features are unknown. It is possible they represent burial grounds, but this is unverified speculation and tribal consultation would provide further information.

12. Linear Cairn Alignments Two of the alignments are in the Yellowstone River Study Unit and one in the Garrison Unit. The cairn line in the Garrison Study Unit is well defined and arcs across 400-meters of rolling prairie. One cairn line in the YSR extends for about 300-meters. Origin and function of these alignments are not known, but they possibly represent remnant portions of game driving systems used for herding bison to kill areas.

13. Stone Alignments refer to three sites in the GA having dense concentrations of rocks consisting of patterned and linear stone. Similar to rock cairn sites, they however have a distinct linear alignment or shape.

14. Burial Cairns are rock cairns that the Three Affiliated Tribes and the Standing Rock Sioux Tribes have identified as burials. Numerous other cairns may fall into this category, but lack the consultation necessary to confirm the cairns as burials. Six sites have been identified—three in the GA and three in the G/MT of South Dakota.

15. Rock Shelters are small caves of rock or rock overhangs that provided shelter for human occupants. Two recorded rock shelter sites are found along the south facing slope of Black Butte. They contained evidence of both historic and prehistoric utilization.

32SL351 Rock Shelter at Black Butte

16. Burial Mounds Archaeologists recorded a possible burial mound built on an existing sand dune on the Sheyenne National Grasslands. It stands 35 feet high and is 180 feet in diameter. Coring the mound with a hand auger produced three distinct charcoal smudge layers, but no artifacts or bone fragments. Further work is necessary to confirm if the mound is cultural.

32RM97 Middoni Mound Sheyenne National Grasslands

Human Occupation and Cultural Chronology

The Dakota Prairie Grasslands contains sites covering the entire prehistoric time range of North Dakota. Cultural chronology used in this overview (Table 6) comes from the *Comprehensive State Plan for Prehistory* (NDCP, 1990) and the *Prehistory of the Custer National Forest* (Beckes and Keyser, 1983). The *South Dakota State Plan for Archeological Resources* (Winham and Hannus, 1990) has a very similar cultural chronology.

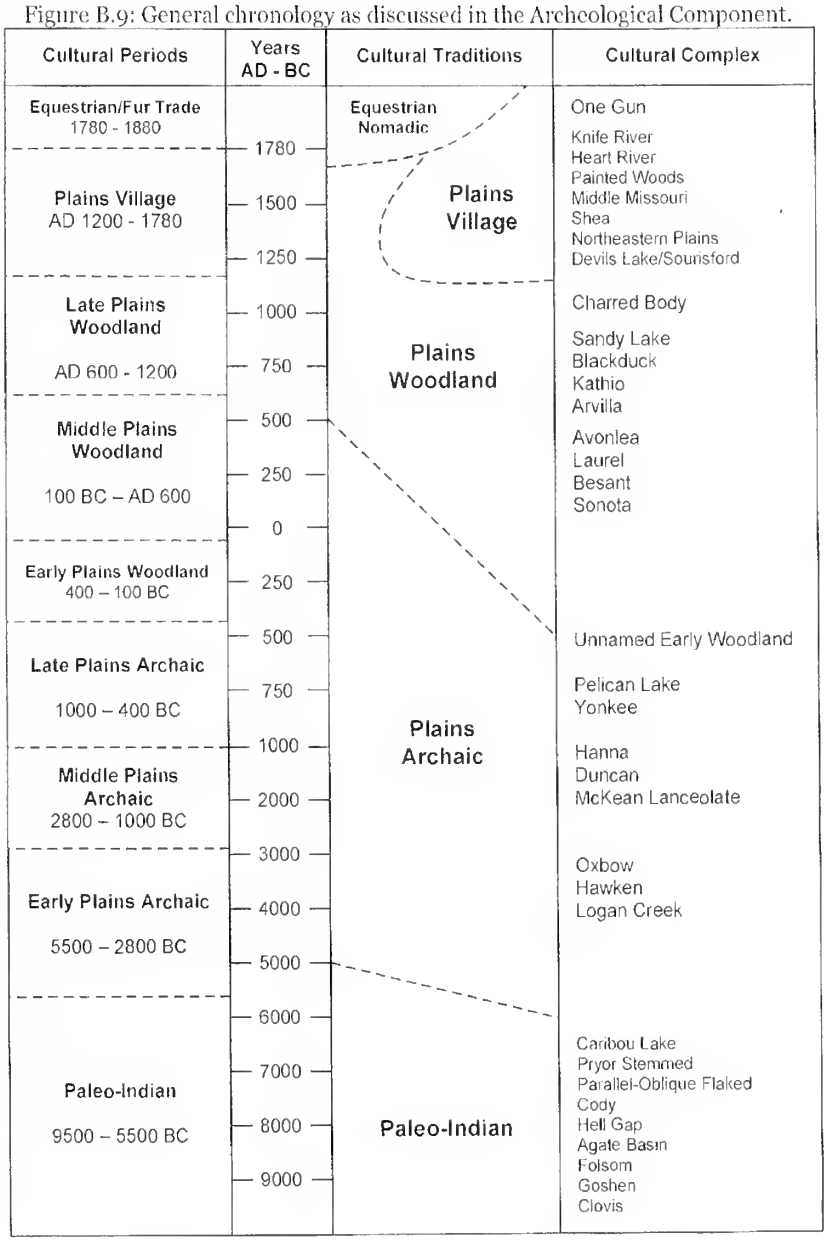
While a large number of sites are known on the grasslands, only a small percentage has actually produced diagnostic artifacts or been test excavated. Also some artifacts have only limited diagnostic traits. The following sections list sites with known components based on diagnostic artifacts, datable charcoal remains or associated toolkits. Surface dates based on artifact seriation are tentative because excavated sites often produce multi-component assemblages. An example is Plains Village (AD 1200-1780) ceramics found on the surface, but a subsurface Late Plains Archaic (3050 BP–AD 100) corner notch point would identify it as a two component site. In a similar vein, generic side-notched Archaic points may suggest a general Archaic (7500 BP–AD 1600) time period rather than a particular identified cultural complex. We used the evidence available to tentatively identify the time period for sites listed in the following sections.

Table 6: Prehistoric Site Summary by Study Unit and National Grasslands

Site Type	LMR LMNG	YSR LMNG	GR LMNG	HR LMNG	CRSU LMNG	CRSU CRNG	SR SNG	G/MT CRNG	Totals %
C.M. Scatter	833 83%	150 53%	29 9%	45 92%	9 90%	6 50%	11 92%	71 83%	1,154 65%
Stone Circles	55 5%	40 14%	186 59%	1 2%	0	1 8%	0	6 8%	289 16%
Rock Cairns	24 2%	54 19%	82 26%	1 2%	0	4 34%	0	4 5%	169 10%
Eagle Trap Pits	58 6%	4 1%	7 2%	0	0	0	0	0	69 4%
Quarry	8 1%	22 8%	0	1 2%	1 10%	0	0	3 4%	35 2%
Bison Kill	4 <1%	8 3%	0	1 2%	0	0	0	1 1%	14 <1%
Conical Lodges	7 <1%	0	0	0	0	0	0	0	7 <1%
Hearth	6 <1%	0	1 <1%	0	0	0	0	0	7 <1%
Vision Quest	5 <1%	0	1 <1%	0	0	1 8%	0	0	7 <1%
Rock Art	3 <1%	0	2 <1%	0	0	0	0	0	5 <1%
Pattern Cairns	0	3 1%	1 <1%	0	0	0	0	0	4 <1%
Linear Cairn Align.	0	2 <1%	1 <1%	0	0	0	0	0	3 <1%
Stone Align-ments	0	0	3 3%	0	0	0	0	0	3 <1%
Burial Cairns	0	0	3 1%	0	0	0	0	3 <1%	6 <1%
Rock-shelter	2 <1%								2 <1%
Burial Mound	0	0	0	0	0	0	1 8%	0	1 <1%
Totals/ %	1005 100%	283 100%	316 100%	49 100%	10 100%	12 100%	12 100%	88 100%	**1775** **100%**

Table 7: Cultural Chronology for North Dakota

Figure B.9: General chronology as discussed in the Archeological Component.



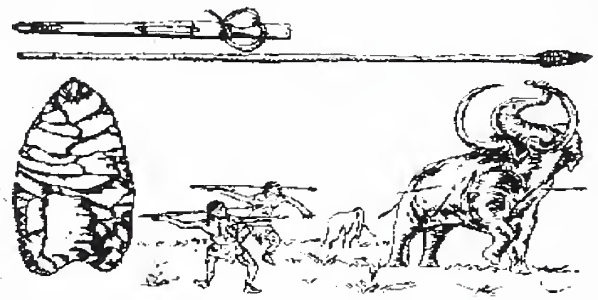
B.14

The Paleoindian Tradition

Evidence of early peopling of the Great Plains, collectively called Paleoindians, first appeared in the Late Pleistocene/Early Holocene and is the oldest cultural tradition currently known in North Dakota and South Dakota. The Paleoindian Tradition dates to ca. 11500 to 7500 BP (NDCP, 1990). At this time, major climatic changes produced extreme variability in vegetative biotic richness. Fluctuations in animal population size related directly to forage production. Following the retreat of the glacial ice sheets, North Dakota was probably an inviting area with large grasslands, parklands and large rivers and lakes common by Late Paleoindian times. A distinct style of large, lanceolate spear points and other well-made stone tools made from high quality materials identify these sites. A large portion of the "big game" hunter's diet was meat. Paleoindian projectile points are fairly common across the western parts of North Dakota. In contrast, these lanceolate spear points are rare in eastern portions of the state.

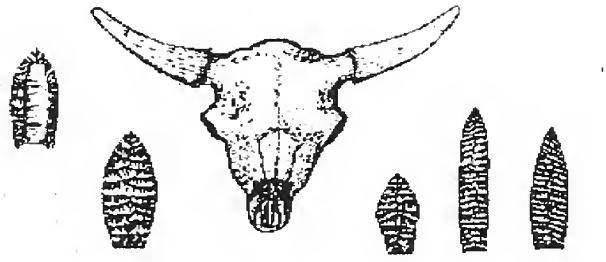
Several named complexes occur within the Paleoindian Tradition based upon diagnostic projectile point styles. The Clovis Complex is associated with the distinctive Clovis fluted, lanceolate spear points and other high quality tools. It is the oldest firmly dated cultural complex that occurred between ca. 11500-11000 BP. They communally hunted mammoth, giant bison, camel and other mega-fauna.

Clovis artifacts and projectile points have been found unequivocally associated with mammoth kill sites and remains of other extinct mammals (Haury et. al. 1959; Stanford, 1999: 281-295). Grasslands and parklands adjacent to large lakes and major rivers were particularly attractive to foraging by Paleoindians. The Goshen Complex dates to the end of the Clovis Complex and the points resemble Clovis, but are not fluted. No components are known in North Dakota, but the complex may date to ca. 11200-10800 BP. Recently discovered archaeological sites in Alaska, indicate the existence of a Pre-Clovis culture dating back to 13000 BP or earlier and utilizing a different style of fluted point (Kunz and Reanier 2010).



A warming trend began and continued to the end of the Pleistocene. By 11000 BP, 33 genera of larger mammals had died out. Some archaeologists attribute this extinction in part to human predation on younger animals. All populations of large ungulates however decreased during this period largely because of a reduction in forage due to warmer, drier climatic conditions. Afterward Paleoindians began to focus primarily on bison for subsistence. Bison continued to evolve into a smaller more mobile species with longer and slimmer legs - an adaptive advantage to an environment of declining and patchy forage (Bonnichsen and Turnmire, 1999:1-14; Frison, 1991:139-184).

The Folsom Culture spanned 1700 years from 11900-10200 BP. Folsom assemblages differentiate from Clovis by smaller fluted or unfluted projectile points as well as a modified tool kit. Folsom fluted points together with kill sites of large Pleistocene bison remains are diagnostic of the Folsom Complex. A number of scientists believe the reduction in projectile point size has a direct technological relationship to the greater emphasis placed on hunting bison (Meltzer, Todd and Holliday, 2000:21-22).



At many Folsom sites, complete processing of carcasses such as evidence of broken long bones (for marrow) and bone grease are not present. Bone marrow was an important source of fat in the hunter/gatherer diet and not simply starvation foods (Artz, 2000:260). In North Dakota, archaeologists generally find Folsom Sites in riverine and lake environments. The presence of Midland, Goshen/Plainview, and Agate Basin, Hell Gap, Cody Complex and Scottsbluff types of projectile points identify other Paleoindian groups.

Folsom points and components have been found in western North Dakota and areas of the Garrison Study Unit. The Hell Gap Complex (110000-9500 BP) and Agate Basin Complex (10500-10000 BP) contain non-fluted lanceolate points used for hunting camel and bison. The more recent Cody Complex (10000-8500 BP) has several diagnostic point styles including Alberta, Scottsbluff, Eden and Cody knives (Stanford, 1999: 296-328; SHSND 1990).

The Little Missouri National Grasslands has several recorded diagnostic isolates from this period, but no confirmed or radio-carbon dated sites. Parallel-Oblique Flaked Complex (10000-9500 BP) include all late Paleo lanceolate points with oblique flaking patterns and includes Yuma, Angostura, Milnesand, Browns Valley, Lusk, Frederick and Allen point types. Finally, Prior Stemmed Complex (8500-7500 BP) points range from stemmed to lanceolate in shape.

Table 8: Paleoindian Sites in the Little Missouri River Study Unit

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32BI825	Unknown	Parallel flaked point midsection	C.M. Scatter
32BI857	Cody Complex	Cody Knife	C.M. Scatter
32BI720	Unknown	Unknown	C.M. Scatter
32GV138	Folsom Complex	2 broken Folsom Points and channel flakes	C.M. Scatter
32SL100	Parallel-Oblique Flaked Complex	Angostura Points 5,285 +/- 65 BP 5,300 +/- 60 BP 5,570 +/- 110 BP	C.M. Scatter
32MZ417	Parallel-Oblique Flaked Complex	Point Midsections	C.M. Scatter

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
	Hell Gap Complex	Hell Gap Point	
32MZ499	Agate Basin Complex	Point Midsections	C.M. Scatter
32MZ570	Agate Basin Complex	Point Midsection	C.M. Scatter
32MZ1066	Agate Basin Complex	Point Base	C.M. Scatter
32MZ1647	Scottsbluff	Scottsbluff Point Base	C.M. Scatter

To date, the Pretty Butte Site (32SL100) in the LMR is the only excavated site with Paleoindian materials. Test excavations and surface collection recovered four Angostura projectile points. Archaeologists excavated a fire hearth feature to a depth between 83 to 96 centimeters. They collected three radiocarbon samples from this feature and submitted them to three different institutions for analysis. Surprisingly, the dates averaged 5385 BP or Early Archaic (Borchert, Klinner and Loendorf, 1991). In contrast, Parallel-Oblique Flaked Complex, which includes Angostura points, is generally thought to be Paleoindian. The author suggests these are essentially transitional Paleoindian to Early Archaic side-notched points without the side notches. Evidence indicates side-notched point styles did not become common in southwestern North Dakota until around 5400 BP. This site is largely intact and future research will continue to add to the knowledge of the Paleoindian/Early Plains Archaic transition.

At 32BI720, a perfunctory test recovered Early Archaic and Late Archaic components, but stratigraphy suggests Paleoindian age deposits may be present (McKibbin,1990). Project archaeologists recommended further systematic testing and deep auguring to determine the presence or absence of Paleoindian material. Other Paleoindian sites include surface finds of Folsom Points at 32GV138; the recovery of a Cody Knife at 32BI857 and a un-typed parallel flaked lanceolate point midsection from 32BI825 (NDCP, 1990). These finds in Billings County await further testing and research.

32BI857 Cody Knife

In McKenzie County, surface reconnaissance discovered Paleoindian artifacts at four sites and several isolated finds, but no subsurface testing or further evaluation has taken place. A linear ridge system at 32MZ417 yielded several lanceolate midsections which exhibit fine, oblique ripple flaking characteristic of the Parallel-Oblique Flaked Complex and a single Hell Gap Point (Beckes and Keyser, 1983). The remaining three sites, 32MZ499, 32MZ570 and 32MZ1066, all contained fragments of Agate Basin Points. These site locations await further testing and research to verify past Paleoindian occupations. A Scottsbluff point was recovered in a shovel probe at 32MZ1647. No other Paleoindian artifacts or dates were recovered (Hiemstra, 2006).

Kuehn's (1990) work at Theodore Roosevelt National Park's South Unit showed potential for Paleoindian sites in the intact Leonard Paleosol (13070-9200 BP) found on the upper ridge top areas, in low swales, and areas that trapped and preserved the sediment. Though quite rare, Kuehn recorded three locations in the South Unit. So far, the Little Missouri National Grasslands has no known areas of intact Leonard Paleosol but the National Park Service study has demonstrated the potential.

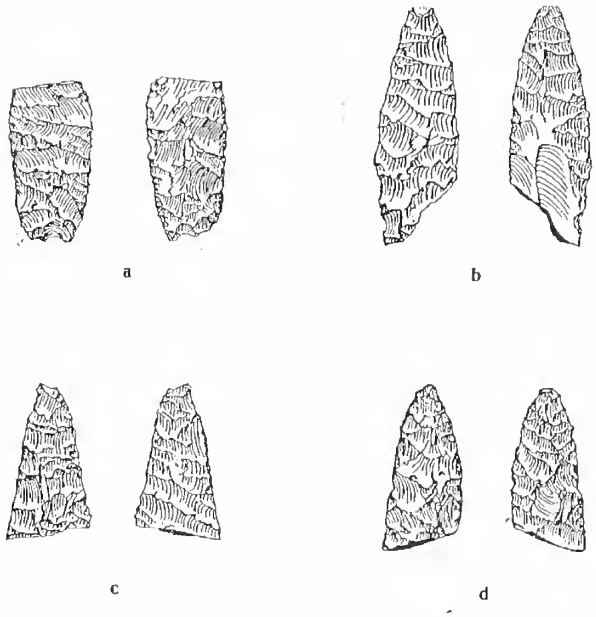
THE PRETTY BUTTE SITE-32SL100

The Pretty Butte site is located on the remnant of an eroded terrace in heavily dissected terrain between Pretty Butte and the Little Missouri River. The site was recorded as a cultural material scatter eroding from the terrace edge in 1986. Surface collection from the site included four parallel-oblique projectile point fragments. Testing of the possible Paleoindian site was accomplished in the summer of 1986 in order to determine if intact deposits remained at the site, establish site boundaries, and to expose deposits along the existing cutbank to determine the cultural and natural stratigraphy for site context (Borchert, Klinner and Loendorf, 1991).

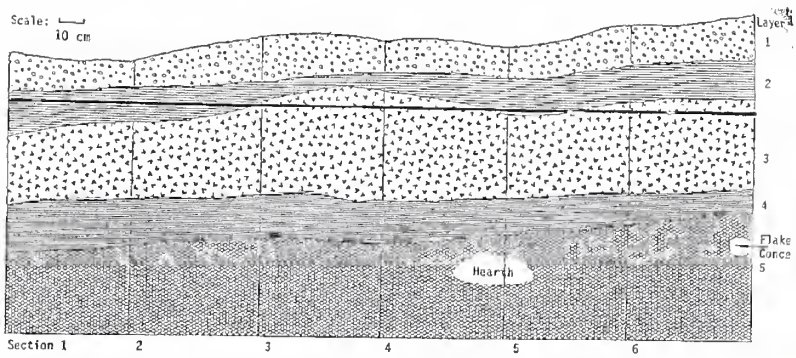
The testing revealed that the Pretty Butte Site is essentially a single component site dating to about 7365 BP. The site occupants made and used Angostura projectile points. Site activities include lithic procurement and reduction with general domestic campsite activities. The four projectile points were collected during the surface inventory along the eroded cutbank face. No other complete tools were recovered from the site during the excavations. Expedient flake tools were recovered along with cores, early stage biface fragments, a hammerstone and assorted flake debris associated with the procurement and reduction of local lithic resources.

One hearth feature was excavated along the profile of the cutbank. The feature was located at a depth of 83.5 to 96 cm. below surface. It consisted of a light flecking of charcoal (.3 grams) and a heavily stained matrix with flakes and fire-cracked rock. The feature was an amorphous stain tapering inward from top to bottom. Three samples collected for dating analysis consisted of two stained matrix and one of charcoal. The resultant dates were 5,300 +/- 60 BP and 5,570 +/- 110 BP for the stained matrix samples and 5,285 +/- 65 BP for the charcoal sample. The hearth and all cultural materials were located in horizon 5 beneath two buried paleosols, horizons 2 and 4, both of which were found to be culturally sterile from the small test excavations conducted at the site. The flaked cultural materials were recovered from the levels of the hearth stain between 80 and 100 cm. below the modern surface.

The four projectile points were compared with similar parallel-oblique flaked points from other sites in the Great Plains including Angostura, Frederick, Lusk, and James Allen point styles. Analysis of the points suggest subsuming the Frederick and Lusk point types under the Angostura type and identified the points from Pretty Butte as Angostura. This suggests the site is assignable to the Paleoindian Tradition. Lanceolate points similar to the four found at the Pretty Butte site are all older than the side-notched projectile point of the Early Plains Archaic Tradition. The problem with the Paleoindian designation of the Pretty Butte site is the dates. The dates from the site are all about 1,000 years too young to be compared to similar point styles from the literature in surrounding states and areas. The literature review suggests that by 7,000 BP lanceolate point forms have been replaced by the large side-notch point types. The large side-notched points have appeared in North Dakota between 7,195 +/- 115 BP and 5,345 +/- 110 BP according to the recent reported studies.



Projectile Points from 32SL100—Pretty Butte Site



Key: Layer 1. 10YR5/2 Very Fine Sandy Silt
2. 10YR4/2 Very Fine Sandy Silt
3. 10YR5/3 Very Fine Sandy Silt
4. 10YR4/2 Very Fine Sandy Silt
5. 10YR6/2 Very Fine Sandy Silt

Stratigraphic Profile from 32SL100—Pretty Butte Site

Given this time range for large side-notched points in North Dakota and adjacent areas, how can we explain the lanceolate Angostura points from Pretty Butte, a discrepancy of over 1,000 years too recent in date? Several explanations were offered:

1.) *The radiocarbon dates may be the source of the error. This is a probable explanation for a single date, but three dates from different radiocarbon labs are all consistent for the site. This makes the dating error less likely. The clustered nature of the dates with overlapping sigma indicates a strong likelihood that the dating is accurate.*

2.) *Perhaps the dates are accurate, but they are not associated with the recovered projectile points from the site surface. The points were from the eroded bank and not recovered from the excavations which recovered the associated hearth. This explanation is plausible for multi-component sites with multiple cultural occupation events. The Pretty Butte site, from the excavation results, is a single component site. The test excavation and the probes associated recovered all materials in the 80-100 cm. below surface level associated with the hearth stain. In addition, the point lithic types (petrified wood and chalcedony) are consistent with all recovered materials. All information strongly suggests the single component at the site and that the points are likely associated with the dated hearth.*

3.) *The points may have been collected elsewhere and carried to the site by Archaic period hunters. This explanation is less likely given that four point fragments were recovered rather than one complete point.*

The authors of the report suggest the most likely hypothesis is that the site and its contents represent a remnant culture of hunters and gatherers who still made and used lanceolate points at 5500 BP. The site is relatively isolated and is located at the terminus of the proposed diffusion of new side-notched point technologies and may represent a case of cultural lag. In addition, the morphology of the lanceolate points and side-notched points is essentially the same except for the side-notches. The authors then argue that side-notching was not an accepted practice in North Dakota until about 5400 BP. The use of lanceolate points is a diagnostic marker defining the Paleoindian Tradition. The presence of lanceolate points at Pretty Butte during the Paleoindian/Archaic interface suggests this site is an example of the last remnants of the Paleoindian life way on the Great Plains. This site holds tremendous potential for continued research into this transitional period in North Dakota and remains a highly significant and little known or understood site in regional prehistory.

Dakota Prairie Grasslands archaeologists are beginning reconnaissance surveys to identify paleosol locations on the LMNG in coming years.

32GVx48 is a recently explored and documented Clovis Cache from the Beach area of Golden Valley County located on private land. I know of no report or documentation of this site location. Artifacts from the cache are on display in the Museum at the State Historical Society. The site adequately demonstrates the potential for these early sites on the Grasslands.

Table 9: Paleoindian Sites in the YSR of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ1301	Hell Gap-Agate Basin Complex	Hell Gap Point	C.M. Scatter

While the various complexes associated with the Paleoindian Tradition can be assumed to be present in the YSR of the LMNG, virtually no information relevant to this time period is available as of this writing. One of the known cultural sites contains materials relating to this period of prehistory is site 32MZ1301. A surface Hell Gap point was located on the site during the recordation. This suggests the site is related to the Hell Gap-Agate Basin Complex. Hell Gap points are typically dated at 10000-9500 BP (NDCP, 2008).

Scattered and sporadic evidence of Paleoindian occupation and use of the LMNG portions of the YSR can be documented by the recovery of isolated finds of Paleoindian projectile points, primarily the Agate Basin Complex point style. Future research will undoubtedly produce evidence of Paleoindian occupation of this region.

While several named complexes are associated with the Paleoindian Tradition based on large spear point diagnostics, and various complexes are known to exist within the Garrison Study Unit, virtually no information relevant to this tradition is available from the LMNG. Paleoindian materials are well known from the Moe Site (Schneider, 1975) which is near Newtown and across the river from the LMNG areas of the GA. The Moe Site contains materials from Clovis Complex and also Folsom, Plainview, Agate Basin, Milnesand, and Angostura projectile points. The site diagnostics span the Paleoindian Tradition and into the Plains Archaic. While these cultural components can be inferred within the LMNG portions as well, to date there is no known Paleoindian cultural materials collected from this study area.

Excavations at 32MZ721 near Feature 20 produced a large lanceolate projectile point from a zone beneath the stone circle construction. This artifact (86.227.340 at the State Historical Society of North Dakota Museum) is reminiscent of large parallel flaked lanceolate points of the Paleoindian Tradition. However, the point has minute corner notches which would suggest a possible Archaic cultural origin. It was speculated the point may have been a reworked Paleoindian point (Floodman, 1988a, p. 167-169). While this is speculation, the point does not fit any known typology for either the Paleoindian or Archaic Traditions.

Future excavations and research in the LMNG area of the GA will undoubtedly produce evidence of Paleoindian occupation of this region. To date, no evidence has been produced from even the deepest excavation projects. Test units at 32MZ732 (Floodman, 1996) were excavated to sterile clay at 90 cm. below surface, with multiple buried paleosols. However, archaeologists found no evidence of Paleoindian materials. The oldest confirmed diagnostics from this site are Early Plains Archaic.

Table 10: Paleoindian Sites in the GA of the LMNG

SITE NUMBER	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ1623	Cody Complex	Scottsbluff Point Fragment	C.M. Scatter

One site in the Blue Buttes unit of the GA contained a projectile point that possibly affiliated with the Cody Complex. The midsection was identified as a possible Scottsbluff point. Projectile points from later Pelican Lake Late Archaic Tradition are also present.

Table 11: Paleoindian Sites in the HR of the LMNG

SITE NUMBER	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32BI814	Parallel-Oblique Flaked Complex	Point Fragments	C.M. Scatter

Little evidence of this tradition is present in HR of the LMNG. A single site may be related to this time period. Site 32BI814 contained two projectile point fragments with parallel oblique flaking. These points are too fragmentary for identification of the exact point type. The flaking patterns suggest a possible affiliation with the Parallel-Oblique Flaked Complex dated roughly 11000 to 9000 BP (NDCP, 1990). No current evidence for the Paleoindian Tradition exists on any of the remaining study units. No artifacts to this period are available in the CR of the LMNG or CRNG, from the SR of SNG or from the G/MT of the GRNG. Future work in these units can be expected to reveal the presence of these artifacts.

The Plains Archaic Tradition

Archaic Hunter/Gatherers

Following the Paleoindian period, the Plains Archaic Period breaks down into the Early Plains Archaic (7500-5000 BP), Middle Plains Archaic (5000-3000 BP) and Late Plains Archaic (3000-2500 BP) sub-periods. An extended episode of drought called the Altithermal took place during the Early Plains Archaic causing a further reduction in vegetation biomass. Few archaeological sites date

to this period, because a concomitant decrease in game herds and other mammals triggered a depopulation or abandonment of large areas of the Great Plains by Archaic peoples.

The mid-Holocene features rapid transitions and climatic change between dry and moist conditions. During the Middle Plains Archaic, the Athithermal drought ended and a cooling trend with rises in moister levels produced a general improvement in climate. Vegetation flourished once again and animals began to thrive on the Great Plains. Human populations rebounded. Nomadic hunter/gatherers lived in tepees and followed the bison herds. Sometime during Archaic period or earlier, the atalatl or spear thrower came into use. It supplied additional leverage for the propulsion of darts (long arrows). The atlatl filled a technological gap between the hand thrown spear and the invention of the bow and arrow. More defined seasonal rounds are a hallmark of the Archaic Period (Frison and Mainfort, 1996:5-7; Gregg, 1994:71-95; Toom and Kordecki, *2006:*2.7-2.9).

The Archaic tradition begins with the cultural adaptations related to modern flora and fauna of the Great Plains area and the disappearance of the large mega-fauna which characterizes the Paleoindian Tradition. It also sees the origins of regionalized projectile point styles, decline of point flint knapping skills, and a reduction in the interaction between geographic areas and cultural groups. (Frison 1978; Beckes and Keyser 1983; NDCP, 1990).

Early Plains Archaic

As stated earlier, the Early Plains Archaic generally coincides with the warming trend referred to as the Altithermal climatic episode and a possible cultural hiatus on the Northern Great Plains along with the idea of refugiums peripheral to the plains during this period (Frison 1975). The Early Archaic includes the Logan Creek-Mummy Cave Complex which dates 7500-5300 BP (NDCP, 1990). This complex is associated with large side-notched projectile points. Named point styles include Simonson, Mummy Cave side-notched, Logan Creek points which are smaller, and Hawken. The Oxbow Complex is based on a distinct side-notched point with a deeply indented base which is stylistically distinctive. Oxbow components are expected to date ca. 5300-4500 BP (NDCP, 1990) in North Dakota. Early Archaic cultures are not well known in the grasslands as a whole.

Table 12: Early Plains Archaic Sites in the LMR of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32BI27	Oxbow Complex	Oxbow Point	C.M. Scatter
32BI40	Oxbow Complex Mummy Cave Compex	Oxbow Point Side-Notched Point	C.M. Scatter
32BI145	Mummy Cave Complex	Side-Notched Point	C.M. Scatter
32BI206	Unknown	Point	C.M. Scatter
32BI249	Mummy Cave Complex	Hawken Point	C.M. Scatter
32BI286	Mummy Cave Complex	Lookinbill Point	C.M. Scatter
32BI317	Mummy Cave Complex	Side and Corner-notched Point	C.M. Scatter
32BI459	Unknown	Point	C.M. Scatter
32BI460	Oxbow Complex	Oxbow Point	C.M. Scatter
32BI720	Unknown	Unknown	C.M. Scatter
32BI857	Oxbow Complex	Oxbow Point	C.M. Scatter
32BI979	Oxbow Complex	Oxbow Point	C.M. Scatter
32BI999	Oxbow Complex	Oxbow Point	C.M. Scatter
32SL71	Mummy Cave Complex	Side-Notch Point	C.M. Scatter
32SL254	Oxbow Complex	Oxbow Point	C.M. Scatter
32MZ190	Oxbow Complex	Oxbow Point	C.M. Scatter
32MZ191	Mummy Cave Complex	Hawken Point	C.M. Scatter
32MZ257	Oxbow Complex	Oxbow Point	C.M. Scatter
32MZ266	Oxbow Complex	Oxbow Point	C.M. Scatter
32MZ380A 32MZ380D	Unknown Unknown	5315 +/- 60 BP 5355 +/- 100 BP	C.M. Scatter
32MZ417	Oxbow Complex	Oxbow Point	C.M. Scatter
32MZ487	Mummy Cave Complex Oxbow Complex	Hawken Point Oxbow Point	C.M. Scatter
32MZ1092	Mummy Cave Complex	Hawken Point	C.M. Scatter
32MZ1184	Oxbow Complex	Oxbow Points	C.M. Scatter
32MZ1492	Oxbow Complex	Oxbow Points	C.M. Scatter
32MZ1656	Oxbow Complex	Oxbow Point	C.M. Scatter

Excavation at 32BI317, Marsh Hawk Site, produced evidence of Early Archaic cultural components at the deepest levels. Zone D represents the lowest cultural deposits immediately above the sandstone bedrock. No diagnostic or datable features were encountered in this zone, but based on stratigraphic positioning, its temporal range is estimated to be 5000 BP and relate to the Altithermal drought period (Simon and Keim, 1983). Zone C, immediately above Zone D, contained cultural materials in the upper part associated with a buried soil zone which contained Middle Archaic cultural materials, and from the lower portion beneath the paleosol, deposits of Early Archaic age. Three side and corner notches projectile points recovered relate to point styles of the Mummy Cave Complex (Simon and Keim, 1983). No radio-carbon dates for the Early Archaic materials were recovered in Zone C.

THE MARSH HAWK SITE--32BI317

The Marsh Hawk site is located on Anderson Divide at the high point of the ridgetop separating Magpie Creek to the north and Anderson Coulee on the south. The Little Missouri River lies about four miles west of the site. A large spring is located at the head of a hardwood draw about 200 meters southeast of the site. It is one of several multi-component camp sites along Anderson Divide. The site was extensively mitigated prior to road construction by UNDAR-West in 1981 (Simon and Keim, 1983). Information about the last 5,000 years of environmental and cultural prehistory was recovered.

Uppermost levels of the site are referred to as Zone A. The most recent aboriginal occupations at Marsh Hawk occurred during the Historic period in Zone A, Level 1. The temporal range for this uppermost zone is ca. 100-400 BP. Diagnostic artifacts from this zone consist of side and corner-notched and un-notched triangular arrow points. Plains Equestrian or Plains Village Tradition cultures could have occupied the site during this time. Included in this zone and level is Feature 12, a partial stone circle ca. five meters in diameter. An indistinct fire hearth near the center of this circle yielded a radiocarbon date of 100 BP. Side-notched arrows, end scraper and deer/pronghorn remains were recovered along with a large amount of chalcedony debitage in the interior of the circle. Environmental conditions were similar to the present. The lower portions of Level 1 Zone A and Level 2 are estimated to date ca. 2,255-440 BP. They consist of Late Woodland and Late Archaic materials.

The Late Woodland occupation ranges from ca. 1500-440 BP with diagnostic materials of side-notched arrow points. Feature 20 was a shallow amorphous hearth yielding a date of 440 BP. Two other Features, 9 and 11, were from the same cultural level, but failed to produce datable materials. Side-notched points, dense bone and debitage concentrations are from Late Woodland occupations. A majority of materials from Zone A, Level 2, are Late Plains Archaic and associated with corner-notched Pelican Lake Complex projectile points. This occupation is dated ca. 2255-1500 BP. Features 1A and 1B produced corner-notched points associated with the slab lined hearths. A date of 1905 BP was recovered from the feature along with deer/pronghorn faunal remains. Feature 22, from a later monitor report, was also slab lined and yielded a date of 2255 BP. Feature 10 was also from this level, but no date was recovered. These occupations were associated with a paleosol. The zone exhibits evidence of higher moisture about 2000 BP to a period of greater instability which resulted in burial of this paleosol by Aeolian deposits.

Deposits beneath the upper paleosol were termed Zone B. No radiocarbon dates were recovered for this zone, but it is dated ca. 3570-2255 BP within the Archaic Tradition based on relative stratigraphy and dates from Zone A, Level 2, and Zone C. Zone B yielded less material than Zone A. A corner-notched point or hafted drill was recovered but was untyped. An amorphous hearth, Feature 19, was found in Level 3, but was not datable. Environmental conditions in this zone were warm and dry indicating severe drought.

Zone C is associated with a paleosol development beneath Zone B. Cultural occupations in the upper portion of Zone C are affiliated with the Hanna Complex of the Middle Plains Archaic. The lower deposits belonged to with the Early Plains Archaic and include early small side-notched, convex base and large corner-notched, convex based projectile points. The temporal range for Zone C is 5240 to 3570 BP. A large amorphous hearth, Feature 4, was dated to 3570 BP in association with a large corner-notched point. Other diagnostics in this level of Zone C include a Hanna point and corner or stemmed point fragments. Features 15A and 15B were amorphous hearths which lack datable materials. Archaeologists found a single post mold, Feature 3, in this zone. A corner-notched point was found at the same level, beneath the lower paleosol dated 3570 BP by Feature 4. A series of post molds was found in Level 5 and labeled Feature 8. The post molds were associated with a small hearth, Feature 18, which was not datable. A similar series of post molds was defined in Level 4 of Block 8 and labeled Feature 6. It was postulated the post molds were the remains of a structure and shelter. This is the oldest evidence of habitational structures yet identified on the Little Missouri National Grasslands. The paleosol at the top of the zone suggest a moister and more stable occupation period overlying a drier period of marked instability noted by undifferentiated Aeolian deposits.

The lowest cultural deposits at Marsh Hawk are found in Zone D which consist of sandy deposits immediately above the bedrock sandstone formation at the bottom of the site. No culturally diagnostic artifacts were recovered in this zone and no dated hearths were present. It was dated by its stratigraphic position. The estimated temporal range for this zone is 5000 BP. It is thought to represent the Early Plains Archaic Tradition as represented during the Altithermal climatic interval. The lithics are all heavily patinated. The rapid Aeolian deposition suggests an unstable period of rapid accumulation with no associated soil development. This fits with the low moisture and arid conditions for the Altithermal.

The Marsh Hawk site has offered a rare opportunity to study a temporal sequence of cultural occupations and environmental change in a study area dominated by nomadic populations and subject to extreme erosional forces. A series of temporary occupations has been hypothesized for the site consisting of short term campsites from the terminal Altithermal ca. 5000 BP to Historic ca. AD 1800. The site is eligible for nomination to the NRHP. Most of the site has been subsequently destroyed by the construction of oil related access roads and pipelines.

At 32BI286, a basal portion of a large side-notched point classified as a Lookinbill type was recovered from test unit 0N/92E in level 0-10 cm. This point is dated to 7,140 BP +/- 160 years in Wyoming and is attributable to the Mummy Cave Complex of point styles (Campbell, 1983). Given its location in the upper soil levels of a Late Woodland site, the point is considered to lack context and is intrusive to the level. An Early Archaic component was not confirmed at the remaining areas of the site excavations.

At 32BI249C, a Hawken point from the Mummy Cave Complex was recovered at level 7 (70-80 cm. below surface) in test unit 3F. The Hawken point was probably dropped on top of tertiary clays (Level 8) and subsequent erosion removed the majority of the matrix associated with these materials leaving a very shallow deposit relatively dated ca. 7500-7000 BP (Simon, Sheldon, Keim, 1982). Little was recovered in association with the level and point.

At 32BI720, testing at Test Pit 2 a low A horizon buried soil contacts a yellow sand which may be related to the Pick City member. A dense cultural deposit at the base of the paleosol and upper levels of the yellow sand found at a depth of 40-60 cm below surface may be Early Archaic in age. No diagnostics were recovered and these materials may relate to either the Mummy Cave Complex or perhaps the Oxbow Complex (McKibbin, 1990). Further work is needed at this site to clarify the cultural components at the deepest levels of this site.

The Cinnamon Creek Ridge project (East et. al., 1985) produced evidence of the Early Plains Archaic from three sites. The earliest temporally diagnostic artifacts from the ridge are Oxbow points. Surface Oxbow points were collected at 32MZ257B and from 32MZ256. A third Oxbow point was excavated at 32MZ257B in an undated context from Stratum IV, 20-30 cm. below surface. The lowest paleosol identified in testing at 32MZ380A (Stratum I) produced a humic date of 5315 +/- 60 BP and at 32MZ380C.

Stratum X, a humic date of 5355 +/- 100 BP, represents the Lower Thompson paleosol. Few cultural materials associated with these two paleosols, however, dates to Early Archaic occupations on the ridge can be estimated. A few lithic artifacts, but no tools or diagnostics were recovered. Identified at 32MZ380A in Stratum II was another possible Early Archaic component. This paleosol does not directly dated and contain diagnostic artifacts. It lays above the dated paleosol (Stratum I) at 5315 +/- 60 BP and below a paleosol (Stratum III) dated 4260 +/- 105 BP. The latter date is from the Middle Plains Archaic. The intervening cultural strata are suggested to be either a late Early Plains Archaic or early Middle Plains Archaic cultural affiliation. (East et. al., 1985)

The first excavated Oxbow projectile points in the LMR of the Little Missouri National Grasslands, and the first excavated in North Dakota, were recovered in test excavations at 32MZ1184 (Borchert and Wermers, 1994). Oxbow Complex components are present on two low rises along a ridgetop in a Badlands setting. The excavations indicate Archaic peoples were testing and procuring local gravels as tool stone, tool kit refurbishing, stone tool maintenance/manufacture, early and middle stage biface production, and hard hammer core reduction took place at the site. Domestic activities are suggested by small amounts of bone and a metate. Cultural materials occurred to a depth of 30 cm. No features or datable materials were encountered in the limited testing. Good potential for future research remains as a viable option for this site.

Remaining sites, 32MZ190, 32MZ191, 32MZ417, 32MZ487, 32MZ1092, and 32MZ1656 are known from surface discoveries of diagnostic point styles only. Subsurface testing at 32MZ487 did not

THE BOOTS SITE-32MZ732

Volunteers under supervision of forest archeologists conducted archeological investigations at 32MZ732, the Boots Site, as part of the 1995-96 Passports In Time project. The Boots site is situated on a small bench overlooking the breaks of the Missouri River valley. It was found at the head of a hardwood draw which contained an extensive spring utilized by both prehistoric and historic peoples living in the area. An extensive prehistoric occupation site with multiple components is overlain by the foundations of the historic Boots homestead. Occupations at the site span the entire period from the Early Plains Archaic ca. 6770 BP to the Historic Era ca. AD 1943. Over 10,000 artifacts were recovered and analyzed from this project. The majority of the cultural materials are found in the upper 40 centimeters of the soil profile, but areas contain deeper materials and buried soils to a depth of 90 centimeters below surface. This site has a continuous cultural occupation with related pollen and environmental information (Floodman, 1997).

The site occupations are anchored by a humic acid date of 6770 +/- 50 BP from the lowest paleosol at 70-80 centimeters below modern surface. This places the deepest part of the site in the Paleoindian/Early Plains Archaic transition period. Hawken projectile points from the Logan Creek-Mummy Cave Complex and Oxbow projectile points from the Oxbow Complex are the oldest diagnostic artifacts recovered. Both complexes relate to the Early Plains Archaic period. No diagnostics were associated with the lowest dated paleosol, but the date fits well with the baseline parameter for the oldest deposits at the Boots Site.

The Middle Plains Archaic period is well represented at the Boots Site. A total of five Duncan projectile points and one Hanna projectile point were recovered from various block units excavated over the site area. Two subsurface features produced Middle Plains Archaic period dates. Feature 7 is a basin shaped hearth with lining and fill of fire cracked rock. A date of 3180 +/- 80 BP was obtained from charcoal at the base of this feature. Pollen analysis of the feature fill shows the dominant species is sagebrush. Prickly pear cactus pollen indicates potential processing and use. Feature 9 is also a fire cracked rock basin with a radiocarbon age of 3720 +/- 70 BP. Milkwort and cattail pollen indicates a possible use of these plants by site occupants.

Five Pelican Lake projectile points from various levels in the site excavation blocks indicate a Late Plains Archaic period presence. One hearth, Feature 8, is a shallow basin with firecracked rock which intersects and dug through a burned earth in situ hearth adjacent to the basin by early inhabitants. Radiocarbon age assessment places the hearth at 2400 +/- 60 BP, well within the Pelican Lake complex range of age. Pollen evidence from this hearth suggests potential utilization of prickly pear cactus, lemonade berry-type fruits and cattail at this feature. Also of special note at this feature is the recovery of a copper awl from within the feature fill dating to 2400 BP. This is the only known occurrence of Archaic copper in western North Dakota. Little is known of the diffusion and spread of copper west from its source areas in the Great Lakes region of Minnesota and Wisconsin. Recovery of two Besant projectile points and two side-notched dart points at the site, indicate Middle Plains Woodland occupations and a Besant Complex. A sample of 55 body sherds with cord marking suggests a ceramic component roughly contemporary with the side-notched points. This evidence

indicates a fairly extensive Besant/Sonota Complex occupation of the site area, however there was no other evidence such as associated hearths or radiocarbon dates.

Late Plains Woodland and/or Plains Village occupation of the site was evident from the recovered materials. A total of 10 Plains Side-Notched arrow points and 4 unnotched arrow points were recovered from the site excavations. This may be the result of either cultural group, both of which can be considered contemporaneous in the Garrison Study Unit region. Feature 10, a charcoal laden hearth dated to 1240 +/- 60 BP. Pollen from this feature fill indicates ash and elm were prevalent area species and aboriginals used Rose hips and starch grasses for sustenance. One other date of 1390 +/- 60 BP, not related to a hearth feature, was recovered from a large chunk of charcoal in an excavated block unit. These dates and materials could apply to either Late Woodland or Plains Village Tradition cultural groups. Three simple stamped pottery sherds from the site suggest a Middle Missouri cultural group and a Plains Village occupation at the site.

Recovery of a single trade bead and a KRF gunflint indicate a protohistoric Equestrian Nomadic Tradition occupation or the former presence of Plains Village peoples from the later post-contact period. Further research is necessary to document the correct cultural affiliation of these artifacts at the site.

The 1915-1943 Boots site homestead is Historic period with a total of five building features including the residence and basement depression (over which much of the site excavation took place. A total of 1,045 artifacts (11% of the site collection) consist of various historic period artifacts relates to the Boots occupation. Pennies from the site date to 1914 and 1929.

produce any related Early Archaic materials in context. Verification of these sites as Early Plains Archaic cultural components awaits future testing and research.

Early Plains Archaic occupations in the YSR are limited to one site 32MZ547 containing a corner-notched point on the surface. These point types are not well known and do not clearly fit into any defined Early Archaic taxonomic style or type. The site was tested to 70 centimeters below surface (Rippeteau, 1981k), and determined ineligible because of lack of subsurface materials. This site was significantly impacted by pipeline construction. While the cultural complex associated with corner-notched points is not fully defined, they may be related to the other known complexes of the Early Archaic. Future surveys should produce more evidence of the Early Archaic in this region.

Large side-notched points such as Hawken and Simonsen points and isolated Oxbow projectile points were recorded as isolated surface finds in the YSR. However, no known actual sites have yet been found that contain these artifact types.

Table 13: Early Plains Archaic Sites in the GA of LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ732	Logan Creek-Mummy Cave Complex Oxbow Complex	Hawken Point Oxbow Points 6770 +/- 50 BP	C.M. Scatter

A single artifact which may relate to the Logan Creek/Mummy Cave Complex was recovered from testing at 32MZ732. The basal portion of a large side-notched point may be a Hawken type point (Floodman, 1996 & 1997). The point is not dated and its age assessment is based on typology. A buried paleosol in Stratum 7 was humic acid dated.

A paleosol found at about 80-85 cm below surface represents the base of potential cultural bearing strata. Resultant dates were 6770 +/- 50 BP and 7700-7575 BP. No diagnostic artifacts were associated with the soil horizon. A second paleosol was found above the dated horizon with about 5 cm of separation. This slightly younger soil may date to the Logan Creek-Mummy Cave Complex. However, this firmly establishes the potential for terminal Paleoindian to transitional Early Archaic cultural horizons at this site.

Two Oxbow points, projectile points were also recovered from the excavations at 32MZ732 (Floodman, 1996 & 1997). The points are relatively dated because of their distinctive Oxbow point style. Also, the large lanceolate, corner-notched point from 32MZ721 (Floodman, 1988a, p. 167-169), although not attributable to any existing typology, may also relate to the Early Plains Archaic. Future excavation at these sites, particularly at 32MZ732 may produce data of relevance to this time period. Other sites relating to this period have yet to be identified in the GA.

Researchers have yet to identify Early Archaic components on the Dakota Prairie Grasslands portion of the Heart River, Cedar River or Sheyenne River study units. These areas most probably contain undiscovered Early Archaic components. The Rustad Quarry Site (32RI775), an Early Archaic site near the SNG on private land, deserves mention. Running (1995) conducted work at this site situated on an alluvial fan deposit along the valley edge of the Sheyenne River Trench.

The lowest of three formed paleosols contained Early Archaic artifacts, bison bone, and hearth features. The cultural remains radiocarbon date to 7180 BP, 7240 BP and 7550 BP from features. From 8000-4925 BP, alluvial fan deposits first formed and then buried by Aeolian sands. This suggests that Early Archaic (7500-4500 BP) sites can be expected along the trench sides of the river valley, and some areas may contain even older sediments. While none of these alluvial fan sites are currently known in the SNG, an effort to look for these sites may prove fruitful.

Early Archaic is the first documented cultural complex on the Grand River National Grasslands. At 39PE200, archaeologists collected a single large, side-notched projectile point. This isolate may be

related to the Hawken context dated ca. 8000-7000 BP (Winham and Hannus, 1990). No associated materials were found with the point and little future potential for research is present at this location.

Middle Plains Archaic

Middle Plains Archaic is identified by the appearance of the McKean Lanceolate Complex 4500-4000 BP, the Duncan Complex 4000-3500 BP and the Hanna Complex 3500-3000 BP (NDCP, 1990). These people's subsistence economy was diverse and based on food processing, indicated by an increase in ground stone and plant resources, in addition to big game hunting. Middle Plains Archaic complexes are well represented on the Little Missouri Grasslands, especially the Duncan Complex.

Hanna Complex materials are in the upper deposits of Zone C at 32BI317 the Marsh Hawk Site. A Hanna point was recovered from S-27 XU 5A, Level 3. At the top of the zone, a buried A horizon is present and radiocarbon assay taken from Feature 4 dated to 3750 +/- 250 BP. A basin shaped hearth with sandstone lining was discovered in Feature 4 in Block 5 Level 1. Levels 1 and 2 contained Middle Archaic materials.

Table 14: Middle Plains Archaic Sites on the LMR of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32BI22	McKean Complex	Mallory Point	C.M. Scatter
32BI40	McKean Complex Duncan Complex	McKean Point Duncan Point	C.M. Scatter
32BI80	McKean Complex Duncan Complex	McKean Point Duncan Point	C.M. Scatter
32BI82	Hanna Complex	Hanna Points	C.M. Scatter
32BI249G	Unknown	Untyped Point	C.M. Scatter
32BI272	Hanna Complex	Hanna Point 3250 +/- 90 BP 2990 +/- 215 BP	C.M. Scatter
32BI317	Hanna Complex	Hanna Point 3570 +/- 270 BP	C.M. Scatter
32BI319	Duncan Complex	Duncan Point	C.M. Scatter
32BI375	Unknown	Untyped Point	C.M. Scatter
32BI419	McKean Complex	McKean Point	C.M. Scatter
32BI426	McKean Complex	McKean Point	C.M. Scatter
32BI438	Unknown	Untyped Point	C.M. Scatter
32BI632	McKean Complex	McKean Point	C.M. Scatter
32BI756	Duncan Complex	Duncan Point	C.M. Scatter
32BI788	Hanna Complex	Hanna Point	C.M. Scatter
32BI794	Unknown	Untyped Point	C.M. Scatter
32BI809	Unknown	Untyped Point	C.M. Scatter
32BI824	Duncan Complex	Ducnan Point	C.M. Scatter
32BI857	Unknown	Untyped Point	C.M. Scatter

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32BI904	McKean Complex	McKean Point	C.M. Scatter
32BI990	McKean Complex	McKean Point	C.M. Scatter
32SL223	Hanna Complex	Hanna Point	C.M. Scatter
32SL339	Hanna Complex	Hanna Point	C.M. Scatter
32GV17	McKean Complex	McKean Point	C.M. Scatter
32GV147	Hanna Complex	Hanna Point	C.M. Scatter
32GV158	McKean Complex	McKean Points	C.M. Scatter
32GV404	McKean Complex	McKean Point	Stone Circles
32MZ38	Duncan Complex?	Duncan Point? 4130 +/- 120 BP	C.M. Scatter
32MZ257B	Hanna Complex	Hanna Points	C.M. Scatter
32MZ258C	Duncan Complex	Duncan Point	C.M. Scatter
32MZ259A	Hanna Complex	Hanna Points	C.M. Scatter
32MZ263	McKean Complex	McKean Point	C.M. Scatter
32MZ319	Duncan Complex	Duncan Point 3480 +/- 70 BP 3710 +/- 60 BP 4240 +/- 50 BP 4420 +/- 70 BP 4520 +/- 75 BP	C.M. Scatter
32MZ336	Duncan Complex	Duncan Point	C.M. Scatter
32MZ340	Duncan Complex	Duncan Point	C.M. Scatter
32MZ280B 32MZ380A	Unknown Unknown	3155 +/- 70 BP 4195 +/- 80 BP 4260 +/- 105 BP	C.M. Scatter
32MZ394	Unknown	3550 +/- 60 BP	C.M. Scatter
32MZ422	Hanna Complex	Hanna Point	C.M. Scatter
32MZ487	Hanna Complex McKean Complex	Hanna Point McKean Point	C.M. Scatter
32MZ535	Duncan Complex	Duncan Point	C.M. Scatter
32MZ591	Hanna Complex	Hanna Point	C.M. Scatter
32MZ606	Duncan Complex	Duncan Point	C.M. Scatter
32MZ1192	McKean Complex	McKean Point	C.M. Scatter
32MZ1211	Hanna Complex	Hanna Point	C.M. Scatter
32MZ1235	Hanna Complex	Hanna Point	C.M. Scatter
32MZ1285	Duncan Complex	Duncan Point	C.M. Scatter
32MZ1326	Duncan Complex	Duncan Point	C.M. Scatter
32MZ1814	Duncan/Hanna	Duncan/Hanna Point	C.M. Scatter

Features at other block units in Zone C were undatable. The lower levels of Zone C are Early Archaic. Zone C spans the period of 5240 BP-3570 BP (Simon and Keim, 1983). In Level 5 of Block 12, archaeologists identified a series of eight post molds. While not radiocarbon dated, they fall within the relative age range. This is the earliest evidence of occupational structures in the LMR of the LMNG.

At 32BI319, a stemmed base of a Duncan point was recovered in Test Pit 2, Level 3 20-30 cm. Associated materials were sparse and archaeologists found no features or datable materials (Metcalf,

1982). The testing however confirmed a Middle Plains Archaic occupation in a buried context with associated materials. These are the oldest materials known at this multi-component site.

A Middle Archaic component at 32BI286 is suggested, but questionable. About two thirds of the basal end of a lanceolate projectile point of KRF was collected during the monitoring of road construction. The artifact is suspect because it does not resemble established Middle Archaic types such as having a notched or indented base typical of the Duncan point or the blade edges of a Hanna type. The point may be incomplete or reworked. No additional materials from the Middle Archaic were found in testing at this site (Campbell, 1983).

An extensive Middle Archaic, Hanna Complex occupation was excavated at the Cribbage Site, 32BI272 (Aivazian, 1981a). A small hearth Feature 3 in Area A was encountered at 19 cm below surface and extended to 13 cm. in depth. The shallow basin was filled with cracked rock placed on top of the charcoal and ash and dated to 3250 +/- 90 BP. A single obsidian flake sourced to Obsidian Cliff was recovered in association with the hearth. The obsidian hydration date was 2990 +/- 215 BP. This agrees well with the carbon date and the overlap of their single standard deviations equals approximately 3182 BP.

At the Sunday Sage Site (32BI22), a heavily patinated, Mallory type, side-notched point with a concave base was recovered when screening dirt piles from construction (Simon and Borchert, 1981). It is comparable in age and morphology to Middle Plains Archaic, McKean Complex artifacts. The point is dated to ca. 3400-4500 BP in other areas. It is older than the other associated materials at this site.

At 32MZ38, Ice Box Canyon Site, evidence for a possible Duncan Complex component was recovered in Unit 40S/30W at Concentration 1. Hearth feature C was exposed to a depth of 13-22 cm. below surface. Investigators recovered fire cracked rock and flakes in charcoal laden fill dating to 4130 +/- 120 BP (Simon and Borchert, 1981a). In the same unit, a large side-notched point base was recovered from the same level as the hearth. While not complete, the point is similar to Duncan types. The date and the point fit well in the Middle Plains Archaic period.

Excavations along Cinnamon Creek Ridge produced four sites with evidence of Middle Plains Archaic occupations (East, et.al., 1985). Surface finds of Hanna points were made at sites 32MZ257B and 32MZ259A with two points collected at each site. Researchers recovered a Duncan point from the surface of 32MZ258C. Subsurface evidence of the Middle Plains Archaic was recovered at 32MZ319, 32MZ380A and 32MZ380B. Several dated paleosols present were Middle Plains Archaic in age. These paleosols contained with varying amounts of cultural materials. At 32MZ319, a series of paleosols had the following dates: Stratum XIV 3430 +/- 70 BP, Stratum XII 3710 +/- 60 BP, and Stratum X 4240 +/- 50 BP, Stratum VIII 4260 +/- 70 BP and Stratum VI 4520 +/- 75 BP. All of these soils contained lithics and bone. Stratum VI contained an *in situ* Duncan projectile point. At 32MZ380A, Stratum III paleosol dating to 4260 +/- 105 BP contained a few scattered lithics, but no dense concentrations or diagnostics. At 32MZ380B, two paleosols were

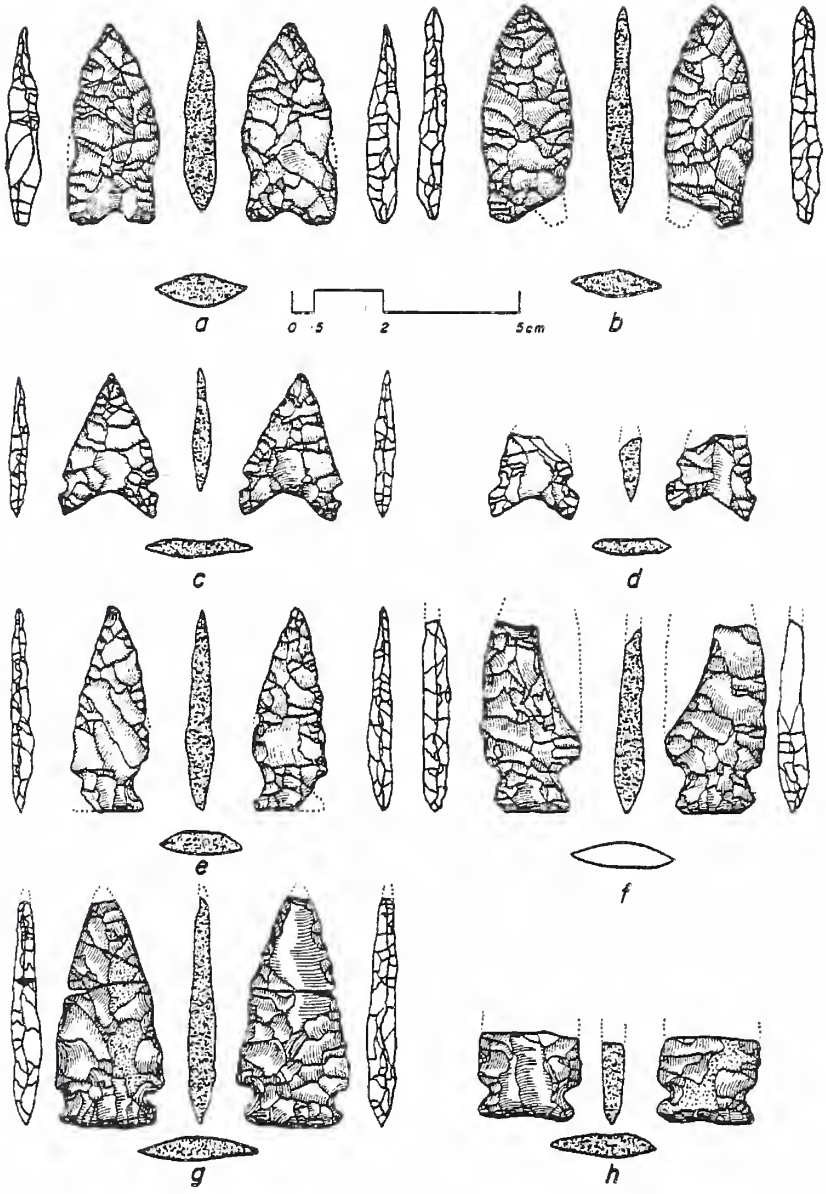
CINNAMON CREEK RIDGE PROJECT

The Cinnamon Creek Ridge site complex occupies a high, linear ridge system on the west side of the Little Missouri River, on the McKenzie Ranger District. The ridge is approximately 7-miles long, varies in width from 20-feet to 1.5-miles and averages 300-feet of higher elevation than the surrounding Badlands. In 1980-81, Pennzoil Corporation funded the University of Pittsburgh (East, et. al., 1985) to conduct an integrated program of surface survey, test excavation, and limited salvage excavation at eight major site locations. They identified largely Middle Plains Archaic Duncan and Hanna Complex projectile points, while other affiliated complexes included Oxbow and Pelican Lake in the Archaic Tradition and Late Woodland and Plains Village Tradition cultural groups.

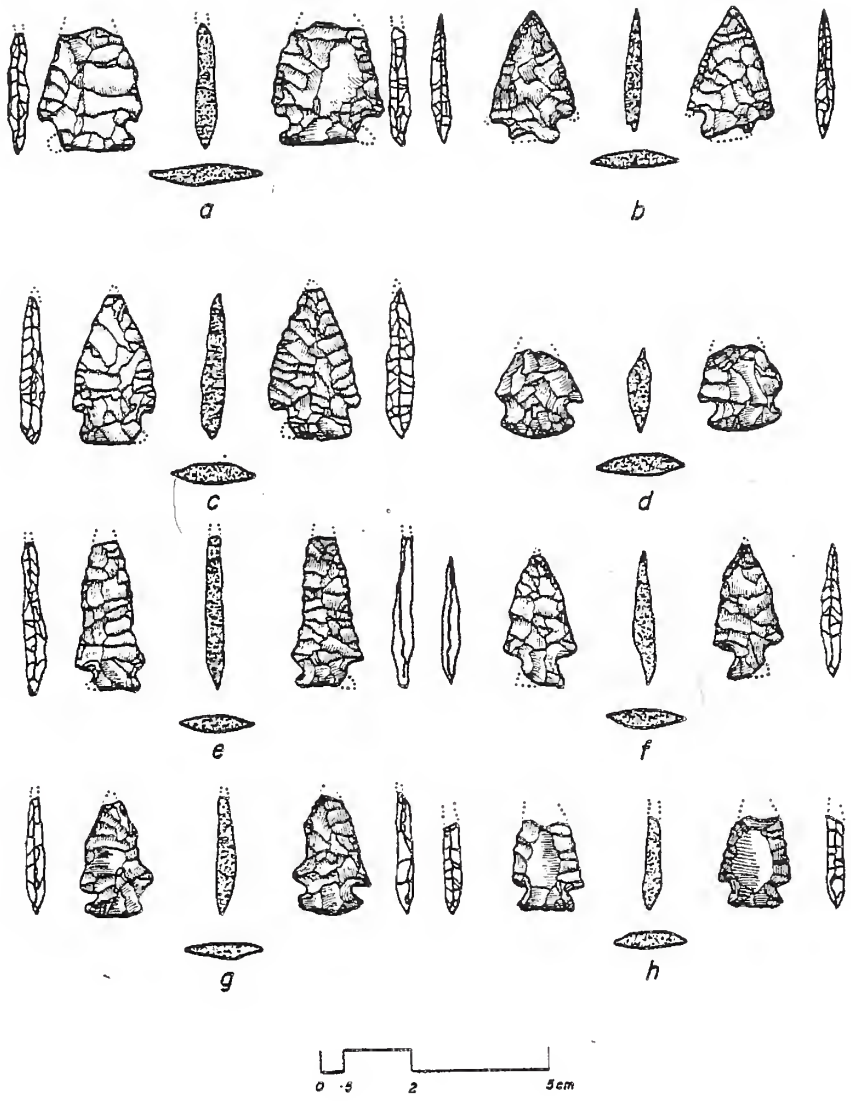
Most of the Cinnamon Ridge sites proved to be short duration transitory camps with moderate lithic assemblages dominated by cutting and scraping implements and projectile points. A series of late summer/early fall hunting/procurement stations had evidence of the elk, deer and sheep utilization for food and processing. Other sites were the focus of intensive artifact manufacturing and maintenance activities. They yielded cores, reduction flakes, sharpening flakes, partially finished tools, and hammerstones. Evidence indicates some activities on Cinnamon Creek ridge represent one specialized phase of an elaborate Middle Plains Archaic seasonal round of subsistence. Preliminary information suggests a greater dependence on medium and small game animals rather than the larger bison kills found in other areas. In addition, the placement of the Middle Plains Archaic sites at narrow bottlenecks in the ridges indicates that surveillance and easy access to surrounding Badlands were important locational factors for Middle Plains Archaic peoples.

Cultural features at Cinnamon Ridge consist of a variety of types of fire hearths and lithic artifact concentrations. Excavated basin shaped hearths containing large amounts of FCR are common. These may suggest resource processing activities requiring heat retention and sustained high temperatures. Stone boiling for bone marrow extraction or bone grease preparation are possible and support the concept of late seasonal forays to obtain products critical for survival in the severe Northern Great Plains winter. Other hearth types include rather large, rock ringed fire features used for general heating and cooking functions and smaller hearths associated with tool manufacture and possible heat treatment of lithic materials.

The Cinnamon Ridge project made another contribution to the understanding of Middle Plains Archaic lifeways. This was the discovery of a deeply buried and stratified Duncan Complex site within a series of paleosols. Duncan artifacts were found at a depth of over 2 meters on a high ridgetop setting. Evidence of pockets of deep, stable sediments have been shown to exist on the ridges once thought to be basically shallow, surface oriented cultural site locales. The Duncan point came from a paleosol dated 4520 +/- 75 BP at 32MZ319 at Stratum VI. Four closely related paleosols above the Duncan point soil were humic acid dated to 4420 +/- 70 BP to 3480 +/- 70 BP. This suggests a series of stable, moist periods with conditions favorable for the development of paleosols during the Middle Plains Archaic period.



Plan, profile and cross sectional views of projectile points from Cinnamon Creek Ridge: a, b, Duncan points; c, d, Oxbow points; e, f, Hanna points; g, h, Besant points.



. . . . Plan, profile and cross sectional views of projectile points from Cinnamon Creek Ridge: a-d, Pelican Lake points; e-h, Small Notched points.

All of the sites along Cinnamon Creek ridge are found within the Oahe formation. Aeolian silts of post-Wisconsin glacial sediment (post-glacial) were deposited directly over the Sentinel Butte geologic formation or upon fluvial gravels and sands. Artifact bearing soil horizons range from sandy silt to silty clay. A minimum of nine and a maximum of 12 distinct episodes of paleosol formation can be distinguished in the Cinnamon Creek ridge area. The earliest defined paleosol formation dates to 5355 +/- 100 BP. The most recent defined paleosol is dated to 530 BP. Most of the paleosols are synchronous with the Upper and Lower Thompson paleosols of the Riverdale member of the Oahe formation. A maximum of 800 years and a minimum of 100 year intervals between soils were evident. No apparent cyclical period of paleosol development is evident on the ridge. Paleosol developed in wetter, moister periods. Intervening depositions occur during warmer and dryer periods with increased Aeolian deposition. Dates from the ridge sites suggest the paleosols form over relatively short periods of time. There is a very high positive correlation between the prehistoric utilization of the ridge and the presence of paleosols. Occupation ranges from Early Plains Archaic (ca. 5350 BP) to the Late Prehistoric (ca. 550 BP). The majority of artifacts and hearths are associated with these soil zones, with only one lithic workshop related to the interval between paleosol developments.

Artifact assemblages from the Cinnamon Creek Ridge sites have greatly assisted in the synthesis of the scope and character of the human occupation of the Little Missouri River Badlands and the Grasslands over the nearly 5,000 years of time represented by radiocarbon dating and relative dating of artifact types.

dated: Stratum XIII 3155 +/- 70 BP and Stratum XI 4195 +/- 80 BP. An extensive lithic concentration was found in Stratum XIII which includes a partial point fragment that appears Middle Archaic in morphology, but is untyped. The radiocarbon date also confirms the age of the level.

Floodman (1998) salvaged a fire hearth from a road cut bank at site 32MZ394 which radiocarbon dated to 3550 +/- 60 BP, well within the Middle Plains Archaic Tradition. He did not discover any other associated diagnostic tools to more accurately identify the cultural complex. The feature was located at a depth of 33 to 35 cm. below surface within a light tan sandy clay soil. The feature extended 10-15 cm downward into the sterile clay subsoil. In this location, the hearth would appear to represent the oldest cultural horizon present at the site. A buried paleosol lies above the hearth and its soil stratum was 20-30 cm below surface. A modern soil horizon extends from the surface to 15 centimeters. Thus, it can be inferred that at least two, and possibly more, cultural horizons may be found at the site and located statigraphically above the dated hearth feature. These horizons are unidentified, and could range in age from Late Plains Archaic to Late Plains Woodland to historic times. Extensive lithic deposits in erosional areas of the site support the contention of further, important cultural occupations at this site.

Table 15: Middle Plains Archaic Sites in the YSR of the LMNG

SITE NUMBER	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ52	McKean Complex Duncan Complex	McKean Point Duncan Point	C.M. Scatter
32MZ270	McKean Complex	McKean Point	C.M. Scatter
32MZ449	McKean Complex	McKean Point	C.M. Scatter
32MZ468	Hanna Complex	Hanna Point	C.M. Scatter
32MZ504	McKean Complex	McKean Point	C.M. Scatter
32MZ752	McKean Complex	McKean Point	C.M. Scatter
32MZ1065	Duncan Complex	Duncan Point	C.M. Scatter
32MZ1849	Duncan Complex	Duncan Point	C.M. Scatter
32MZ2076	McKean Complex	McKean Point	C.M. Scatter

While the Middle Archaic is better known than the Early Archaic, no excavated Middle Archaic components have yet been reported in the LMNG portion of the YSR. Seven period sites are known from surface collections and recordation. All sites producing Middle Archaic diagnostic artifact types were cultural materials scatters. To date, no stone circles or other site types can be classified as Middle Archaic. Projectile points from the six sites are primarily McKean Complex lanceolates. There could be some confusion here in that McKean, Duncan and Hanna points are often lumped as McKean Complex sites. Most of the sites, 5 of 7, are identified as McKean and two sites have Duncan Complex point styles. Only one Hanna Complex component was found. Future research will undoubtedly recover Middle Archaic artifacts and features from an excavated context.

Table 16: Middle Plains Archaic Sites in the GA of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ233	Duncan Complex	Duncan Point	Stone Circles
32MZ454	Hanna Complex	Hanna Point	C.M. Scatter
32MZ677	Duncan Complex	Duncan Point	C.M. Scatter
32MZ721	Duncan Complex	Duncan Points 2830 +/- 80 BP	Stone Circles
32MZ732	Duncan Complex Hanna Complex	Duncan Points Hanna Point 3180 +/- 80 BP 3720 +/- 70 BP	C.M. Scatter
32MZ1007	Hanna Complex	Hanna Point	Rock Cairns
32MZ1622	Duncan Complex	Duncan Point	C.M. Scatter

Six sites from the LMNG portion of the GA have produced artifacts from the Middle Plains Archaic period. Duncan points were found at five of the sites and Hanna points at the other two. McKean lanceolate points have not been noted at any site to date. Of the six sites, three are identified only from surface collections: 32MZ454, 32MZ677, and 32MZ1007. The remaining sites are known from test excavations.

At 32MZ233, a single Duncan point base was recovered in Block Unit B directly associated with hearth feature B-1 (Floodman, 1985a). This is a surface hearth feature consisting of a reddish orange oxidized earth stain. Archaeologists found no evidence of an excavated basin, rock ring or associated dense amounts of fire cracked rock. While 32MZ233 is a stone circle site, hearth B-1 and the Duncan point were located outside of the stone circle rings present, and are not directly relatable to any of the stone features at the site. Diagnostics dated the stone circles to the Late Plains Archaic/Middle Woodland period. Charcoal was absent and subsequently no radiocarbon date was obtained from the feature.

Site 32MZ721 also produced Duncan points from excavation at this large stone circle site. A total of six Duncan point fragments were recovered from the Feature 11 block excavations (Floodman, 1988a). Similar to 32MZ233, this block unit is an exterior activity area outside of any defined stone circle feature. Feature 11 was a small hearth stain heavily disturbed by rodent activity. No basin or stone ring was present. Staining with charcoal was sufficient to carbon date to 2830 +/- 80 BP. This places the occupation at the latter end of the Middle Plains Archaic period.

A seventh Duncan point was also recovered from the 32MZ721 block excavations at Feature 13/14, a large 7.65 meter diameter stone circle. Archaeologists recovered the point from under an interior stone within this circle. Feature is located adjacent to the Feature 11 external block area and it is possible this point was present on the surface prior to the construction of the stone circle. No other diagnostics or datable materials came from the Feature 13/14 block excavations. On the other hand, it is possible this Duncan point is associated with the stone circle which is the only evidence of McKean Complex or Middle Plains Archaic stone rings in the LMNG area of the GA to date.

Excavations at 32MZ732 produced extensive evidence of Middle Plains Archaic occupation (Floodman, 1997). This site is an extensive cultural materials scatter, with no current evidence of stone circle features. Archaeologists recovered five Duncan projectile points and one Hanna projectile point from various excavation blocks at the site. Two hearth features dated to the Middle Plains Archaic period. Feature 7 is a shallow basin shaped pit which is lined and filled with cracked rock. The dense layer of rock was placed over the charcoal deposit found at the base of the feature. The radiocarbon date is 3180+/-80 BP at two *sigma* and 95% certainty. Feature 9 is also a shallow basin shaped hearth with a dense layer of cracked rock over the charcoal deposit. The resultant date from this feature was 3720+/-70 BP at two *sigma* and 95% certainty.

Very little is known of the grasslands portions of the CR in terms of human occupation and cultural chronology. Only one site, 32SL223 had a diagnostic artifact, a projectile point identified as a McKean Complex style of the Middle Plains Archaic, ca. 4500-3000 BP (NDCP, 1990). To date, the earliest diagnostic artifact known from the SNG is a Middle Plains Archaic Tradition, Duncan projectile point. This isolated find was discovered in a dune blowout. The Middle Plains Archaic dates to ca. 4500-3000 BP and the Duncan Complex to about 4000-3500 BP (NDCP, 1990).

A majority of sites for which an age and temporal position can be assumed, fall within the Middle Plains Archaic ca. 7000-2500 BP (Winham and Hannus, 1990). Four sites produced diagnostics from this period. This time period is defined to include the following contexts: Oxbow, McKean/Hanna/Duncan, and Yonkee. All materials from the Grand River National Grassland are from the McKean/Hanna/Duncan context, with three identified point styles. Hanna projectile points came from 39CO158 and 39PE67; a McKean point from 39CO161 and 39PE212; and a Duncan point from 39CO166.

Late Plains Archaic

The Late Plains Archaic identified by the appearance of the distinctive corner-notched Pelican Lake projectile points. The Pelican Lake Complex is tentatively dated 3050 BP to AD 100 (NDCP, 1990). There is a wide range of variation and size in the Pelican Lake point style which can be assumed to have regional and cultural variations through time. Unclassified, Late Plains Archaic components are common throughout the Great Plains. Various side and corner-notched points have been encountered which are contemporaneous with the Pelican Lake. This portion of the Late Archaic is not well known and other named complexes may at some time be identified.

Table 17: Late Plains Archaic Sites in the LMR of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32BI22	Pelican Lake	Pelican Lake Point	C.M. Scatter
32BI88	Pelican Lake	Pelican Lake Point	C.M. Scatter
32BI95	Pelican Lake	Pelican Lake Point	C.M. Scatter
32BI154	Pelican Lake	Pelican Lake Point	C.M. Scatter
32BI249C	Pelican Lake	Pelican Lake Point 3030 +/- 145 BP 2680 +/- 300 BP	C.M. Scatter
32BI272	Pelican Lake	Pelican Lake Point 1090 +/- 70 BP	C.M. Scatter
32BI286	Pelican Lake	Pelican Lake Point 2140 +/- 175 BP	C.M. Scatter
32BI293	Pelican Lake	Pelican Lake Point	C.M. Scatter
32BI317	Pelican Lake	Pelican Lake Point 1905 +/- 130 BP 2255 +/- 150 BP 2100 +/- 60 BP	C.M. Scatter
32BI319	Pelican Lake	Pelican Lake Point	C.M. Scatter
32BI353	Pelican Lake	Pelican Lake Point	C.M. Scatter
32BI737	Pelican Lake	Pelican Lake Point	C.M. Scatter
32BI743	Pelican Lake	Pelican Lake Point	C.M. Scatter
32BI820	Pelican Lake	Pelican Lake Point	C.M. Scatter
32BI972	Pelican Lake	Pelican Lake Point	C.M. Scatter
32BI979	Pelican Lake	Pelican Lake Point	C.M. Scatter
32BI996	Pelican Lake	Pelican Lake Point	C.M. Scatter
32BI1057	Pelican Lake	Pelican Lake Point	C.M. Scatter
32BI1081	Pelican Lake	Pelican Lake Point	C.M. Scatter

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32GV17	Unknown	Untyped Point 1949 +/- 101 BP	C.M. Scatter
32GV157	Pelican Lake	Pelican Lake Point	C.M. Scatter
32SL27	Pelican Lake	Pelican Lake Point	C.M. Scatter
32SL36	Pelican Lake	Pelican Lake Point	C.M. Scatter
32SL68	Pelican Lake	Pelican Lake Point	C.M. Scatter
32SL219	Pelican Lake	Pelican Lake Point	C.M. Scatter
32SL254	Pelican Lake	Pelican Lake Point	C.M. Scatter
32SL326	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ38	Pelican Lake	Pelican Lake Point 2110 +/- 90 BP 1740 +/- 80 BP 1630 +/- 80 BP 2670 +/- 70 BP	C.M. Scatter
32MZ218	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ224	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ257B	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ260	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ292	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ299	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ342	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ380A	Pelican Lake	Pelican Lake Point 2105 +/- 60 BP 2820 +/- 70 BP	C.M. Scatter
32MZ391B 32MZ391D	Unknown Pelican Lake	2575 +/- 60 BP Pelican Lake Point	C.M. Scatter
32MZ422	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ487	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ526	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ574	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ586	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ625	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ628	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ629	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ652	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ713	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ837	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ1005	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ1022	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ1092	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ1186	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ1312	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ1434	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ1450	Pelican Lake	Pelican Lake Point	C.M. Scatter

Archaeologists recovered Four Pelican Lake projectile points from testing at 32BI22, the Sunday Sage Site, and a fifth point from surface collection. These four points were found scattered at different levels throughout the, site separate from datable materials such as hearths. The number of points and their wide distribution indicates a substantial Late Plains Archaic, Pelican Lake Complex

occupation. Road construction initially disturbed the site and the project was essentially a salvage excavation (Simon and Borchert, 1981).

On a ridge between stream valleys, surveyors discovered an extensive lithic scatter (32BI88) of at least 1,000 flakes eroding from its edge. A test excavation consisting of a 1 X 2 meter unit recovered a "cache-like" feature containing large blanks, bifaces and primary flakes. Archaeologists recovered two Pelican Lake type projectile points which relatively dated the site (Lau and Rydalch, 1980).

Excavations at 32BI249C contained evidence of Pelican Lake occupation in Level 7 (70-80 cm below surface). Two features were excavated from this level of the site. Feature 2 is a large amorphous hearth which yielded a radiocarbon date of 3030 +/- 145 BP. A second hearth at about the same level, Feature 3, was also excavated but insufficient charcoal was available for dating. Researchers recovered two Pelican Lake points in association with these hearths and at a slightly lower depth, a Hawken point of the Early Plains Archaic (Simon, Sheldon, Keim, 1982). A second Pelican Lake date of 2860 +/- 300 came from 32BI249C in the lowest level of a buried paleosol (Simon and Keim, 1983).

At 32BI272, the Cribbage Site, archaeologist's recovered evidence of a Pelican Lake Complex occupation. A large hearth, Feature 2, was excavated eroding from the ridge cut bank along the south edge of the site. Excavators located a shallow fire pit 10 cm. below the modern surface and recovered flakes, bone and fired sandstone from the feature fill, which radiocarbon dated to 1090 +/- 70 BP. Reeves (1969) believes the Pelican Lake Complex began about 1300 BP (Avazian, 1981a). It may have been associated with a fragmentary point from another area of the site.

Testing at 32BI286, Magpie Road Site, recovered information relating to the Pelican Lake Complex. A single Pelican Lake point came from the surface. Excavations at this site discovered seven hearth features and two of these were dated. Feature 5 at Area C was found at a depth of 12 to 24 cm below the modern surface. Radiocarbon assessment of the charcoal from this feature produced a date of 2140 +/- 175 BP (Campbell, 1983). While not directly associated with the Pelican Lake point, this date fits well with known Late Plains Archaic components in the region.

In excavations at 32BI317, on a site wide basis, Zone A, Level 2, the majority of the materials were found to be Late Plains Archaic, Pelican Lake Complex occupations. The full temporal range for this zone is estimated at 2255-440 BP (Simon and Keim, 1983). Block 2, Level 2, produced corner-notched points associated with slab lined fire hearth features 1A and 1B. Feature 1B dated to 1905 +/- 130 BP. During monitoring, a second date of 2255 +/- 150 BP was recovered from Feature 21 a slab lined hearth. During another monitor project, a third slab lined hearth feature was radiocarbon dated to 2100 +/- 60 BP (Floodman, 1987). An average date of 2087 BP provided the Pelican Lake occupation baseline for Zone A, Level 2.

ICE BOX CANYON SITE--32MZ38

The Ice Box Canyon site lies on the western portion of a linear ridge system known as Flat Top Butte. The ridge runs in a general northwest to southeast direction for approximately 14 miles along the east edge of the Little Missouri River valley. It ranges from 100 feet to three-quarters of a mile in width and in places rises 300 to 400 feet above the surrounding Badlands. Flat Top Butte is a prominent landmark along the ridge and is the location of another large cultural scatter site, 32MZ422 (Flat Top Butte Site).

In 1978 and 1979 archaeologists conducted survey reconnaissance and preliminary evaluative testing along the ridge by a variety of oil and gas companies prior to developments in the area. An extensive and intricate complex of archeological sites were discovered and investigated as the mineral development continued. Site 32MZ38 is one extensive prehistoric cultural scatter containing six disparate concentrations along the ridgetop west of Flat Top Butte and above the south edge of Ice Box Canyon. UNDAR-West tested and evaluated the complex in an effort to locate a pipeline route through the identified areas of concentration. Testing identified five of the areas as very sparse cultural activity areas with little deposition or potential for research and one area, C-1, which contained well preserved, intact Middle Plains Archaic and Late Plains Archaic cultural zones of great potential scientific significance (Simon and Borchert, 1981).

Excavation in three subareas of C-1 revealed two distinct cultural strata containing four basin shaped fire hearths and a dense artifact assemblage. A marked dichotomy in lithic material preference and utilization was noted between Levels II and III with 88% Knife River Flint (KRF) in the former and 86% grey porcellanite in the latter. This difference may reflect use of the site by a Pelican Lake cultural group moving westward after a visit to the KRF quarries, as little evidence of tool manufacture occurs in this level and KRF is not locally available. Predominance of a locally occurring grey porcellanite and extensive quantities of chipping debris suggest that the one group of Late Archaic occupants either did not yet have access to the KRF quarries, or had not yet acquired the tool making material in their seasonal round.

Hearth features in the limited Ice Box Canyon excavations are characterized by prepared, excavated basins containing occasional fire cracked rock, burned earth, charcoal, stone artifacts, micro flakes, and windblown sediments. The deepest hearth associated with an apparent Duncan/Hanna Complex variant projectile point and a hafted sidescraper produced a radiocarbon date of 4130 +/- 120 years BP. Three dates were obtained from fill materials in a hearth associated with the Pelican Lake Complex. Dates ranged from 2110 +/- 90 BP to 1740 +/- 80 BP. This conforms well within the known range of Pelican Lake dates on other sites in the Great Plains. A final basin shaped hearth with a single associated post mold yielded a 2670 +/- 70 BP date, again falling within the Pelican Lake Complex time frame.

Use phase analysis developed by Ahler and Swenson at the University of North Dakota was applied to the artifacts from the Ice Box Canyon site. Results suggest the predominance of knives,

perforators, and scrapers as opposed to projectile points in the various components support the identification of the site as a series of transitory base camps. Flat Top Butte ridge is hypothesized by the authors to be part of an aboriginal travel route between the Yellowstone River basin and the headwaters of the Knife River. Ice Box Canyon site data lenses credence to this idea.

This site is significant in its demonstrated ability to produce well preserved, datable Middle Plains Archaic and Late Plains Archaic cultural features, associated materials and tool kits. Further problem oriented research at this site would yield important data in the identification of the ridgetop sites in the Little Missouri River Badlands and of the understanding of the Middle Plains Archaic occupations in the grasslands and especially in the study of the Late Plains Archaic Pelican Lake Complex in the Little Missouri Grasslands.

Testing at 32BI720 (McKibbin, 1990) produced a single corner-notched point was evidence for a buried Pelican Lake Complex component at this multi-component, stratified site. It was found in TU 1 at a depth of 20 cm. below surface. No associated features or datable material was found. This established the probability of buried Late Plains Archaic materials over most of the intact portion of this site.

Testing at 32GV17 (Borchert, Porsche, & Kuehn, 1987) provided marginal evidence for a Late Plains Archaic occupation. In XU 5, Level 2 (10-20 cm) a single Obsidian Cliff (source) flake gave an obsidian hydration date of 1949 +/- 101 BP. This may be attributable to the Pelican Lake Complex or a Middle Woodland Besant occupation. Further work at this site is necessary to establish the identity of the dated component.

Testing identified a major Pelican Lake Complex component at the Ice Box Canyon Site, 32MZ38 (Simon and Borchert, 1981a). At Concentration 1 Nob, two hearths, Features A and B, were found in close proximity and at the same level in contiguous units. Feature B centered on stake 0N/0W at 17-30 cm. below surface and consisted of a basin of fire blackened fill, FCR, flakes and bone. The fill was radiocarbon dated from three samples: 2110 +/- 90 BP, 1740 +/- 80 BP, and 1630 +/- 80 BP, averaging 1827 BP corrected. A Pelican Lake type point came from the same level in an adjacent unit. The date is characteristic of the terminus of Pelican Lake occupations.

Surface finds of other Pelican Lake points in the C-1 area helped verify the presence of this complex at the site. Feature D was excavated at Concentration 1 Draw, unit 0N/150W at a depth of 18-32 cm. below surface. This basin hearth flakes, FCR and charcoal radiocarbon dated to 2670 +/- 70 BP. No diagnostics were in direct association, but the date fits the Late Archaic, Pelican Lake Complex which had already been established elsewhere on the site.

Along Cinnamon Creek Ridge, surface collections of Pelican Lake points were made at sites 32MZ257B and at 32MZ380A. Subsurface Pelican Lake Complex materials were located and dated

at 32MZ380A. Stratum V produced a Pelican Lake projectile point in situ and a rock lined/rimmed fire pit labeled Feature 1. This fire pit radiocarbon dated to 2105 +/- 60 BP. A humic acid date from the paleosol Stratum V provided a date of 2820 +/- 70 BP. Both are Late Archaic dates and can easily be subsumed under the Pelican Lake Complex (East, et. al., 1985).

During the Lone Butte project, Stratum III of 32MZ391B produced a humic acid date of 2575 +/- 60 BP. While no cultural diagnostics were found within the stratum, the date fits well with Pelican Lake Complex sites. At 32MZ391D, a Pelican Lake point was recovered from the site surface (East, et. al., 1983).

Testing at 32MZ1005 revealed a stratified site with multiple occupations. An obsidian artifact came from shovel probe 11, Line 1, at a depth of 10-20 cm below surface. The artifact sourced to Obsidian Cliff and provided a hydration rind date of 2190 +/- 67 BP. No associated diagnostic artifacts from the site were recovered. This suggests that at least one of the components is Late Plains Archaic and may relate to the Pelican Lake Complex because the date is consistent with this complex of other known sites (Newberry and Olson, 1990a). Further work is necessary to identify the full range and temporal association of the occupations at this site.

Table 18: Late Plains Archaic Sites in the YSR of the LMNG

SITE NUMBER	CULTURAL COMPLEX	DIAGNOSTICS/DATE	SITE TYPE
32MZ864	Pelican Lake?	Corner Notch Point	C.M. Scatter
32MZ333	Pelican Lake?	2270 +/- 80 BP	C.M. Scatter
32MZ1051	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ685	Pelican Lake?	Corner Notch Point	C.M. Scatter
32MZ1336	Pelican Lake	Pelican Lake Point	C.M. Scatter

During recordation of 32MZ1051, a single Pelican Lake point was found on the surface, but excavation did not produce any other Late Plains Archaic material. The only other Pelican Lake point was excavated along a cutbank of the ridge edge at 32MZ864 (Borchert, 1989c). At 32MZ685, archaeologists recovered a large corner-notched dart point from the surface of the tested site. This point was not classified as Pelican Lake, but the large, deep corner notches are most likely attributed to this complex. No dateable subsurface deposits or features were found at this site (Floodman, 1984a).

One other site has produced possible evidence of a Late Plains Archaic occupation from an excavated context. At 32MZ333 (Floodman, et. al., 1982), Cultural Horizon I, Feature 9 consisted of a dark black fill with charcoal flecking, seven pieces of debitage and bone fragments located 32 centimeters below the modern surface and 2.3 meters by 1.5 meters and 5-6 centimeters thick. A sample of the feature fill radiocarbon dated to 2270 +/- 80 BP or the end of the Late Plains Archaic period. No diagnostic artifacts were recovered. The Feature was believed to be a possible habitation structure, but no post molds or other evidence of a structure were encountered. The Late Plains

Archaic age is also supported by its stratigraphic location beneath a well defined Middle Plains Woodland and Besant occupation.

While the Late Archaic is common across the majority the LMNG, only three surface collected sites and materials from one excavation have been found to contain Pelican Lake Complex projectile points within the GA portion of the grasslands.

Table 19: Late Plains Archaic Sites in the GA of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ454	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ732	Pelican Lake	Pelican Lake Point Copper Awl 2400+/- 60 BP	C.M. Scatter
32MZ1616	Pelican Lake	Pelican Lake Point	C.M. Scatter
32MZ1623	Pelican Lake	Pelican Lake Point	C.M. Scatter

At 32MZ732, portions of five Pelican Lake corner-notched points were recovered from the test excavations (Floodman, 1997). Feature 8 was a fire hearth excavated during the test program. This feature is a shallow, basin shaped hearth which was filled with dense layers of fire cracked rock and it contained charcoal laden fill which was dated to 2400+/-60 BP at two *sigma* and 95% certainty. This is the only dated Late Plains Archaic site in the GA of the LMNG. While no points were in direct context with this feature, it dates well within the appropriate range and Pelican Lake materials are present over the site area. As mentioned previously, Feature 8 at 32MZ732 also contained a copper awl dated to 2400 BP, which is the only known incidence of Archaic copper from the LMNG (Floodman, 1997).

Late Archaic sites are defined as the Pelican Lake context and Unassigned Late Archaic contexts (Winham and Hannus, 1990) in South Dakota. Two sites in the Grand River National Grasslands produced evidence of the Pelican Lake context dated ca. 3000 to 1850 BP. Both Pelican Lake points were surface collected.

The Plains Woodland Tradition

Woodland Hunter/Gatherers

Woodland Vessels

Ancestors of Missouri River horticulturalists originated from the eastern Hopewell groups associated with mound complexes and their superbly crafted grave goods. Following riverine routes out of the Ohio River Valley, Woodlands Culture (2800 BP-1000 AD) gradually moved westward. Early Plains Woodland Culture (2500 BP-1 AD) is distinguished from Late Plains Archaic Culture by the introduction of pottery and smaller projectile points. Middle Plains Woodland (1 AD-600 AD) sites are relatively common in eastern North Dakota suggesting a general increase in the population of Woodland peoples.

Mound burial, mortuary ceremonialism and horticulture began about this time in North Dakota, but the archaeological record lacks direct evidence for this early farming. Introduction of the bow and arrow at this time signifies the transition from Middle to Late Plains Woodland (AD 400-1000) cultures. Changes in ceramic technology also took place in the form of thinner and more well-made vessels, as well as the intensified use of seeds and grasses (Toom and Jackson, 2003:1.12-1.13; Keyser, 2004:18).

The Woodland Tradition is the first major difference between the North Dakota State Plan and earlier chronologies of Frison (1978) and Beckes and Keyser (1983). The Besant Complex in this document is considered part of the Middle Woodland while other earlier chronologies place it within the Late Plains Archaic period. Early Woodland is not well known and fairly rare in North Dakota and South Dakota. Small corner-notched points similar to Pelican Lake are present with ceramic dating to 2410 BP-550 BP in the James River Valley (NDCP, 1990). No known Early Woodland sites are currently identified on the Dakota Prairie Grasslands.

Middle Plains Woodland

The Middle Plains Woodland is the first widespread Woodland culture in North Dakota. This includes the Besant and Sonota Complexes, two very closely related cultures which are often indistinguishable. Besant was the earliest and generally lacks ceramics, while Sonota includes

ceramic technology. Sonota is estimated to date ca. 2100 BP to AD 600. From AD 200-600 Sonota, Besant, Avonlea and Laurel Complexes co-existed across the Great Plains (NDCP, 1990).

32BI22, the Sunday Sage Site, was discovered during the monitor of construction of an oil well access road. Three features were noted in the dozer cut by monitoring crews and a salvage excavation program was later conducted at the site. Feature 1 measured 70 centimeters in diameter and contained fire cracked rock and blackened earth mixed with charred remains. The feature was bowl shaped with a definite basin and fire reddened bottom and edges. Fill from this feature dated to AD 270-320.

Table 20: Middle Plains Woodland Sites on the LMR of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32BI22	Besant	Besant Points 1700 +/- 90 BP	C.M. Scatter
32BI135	Besant/Sonota	Ceramics ca. AD 500-800	C.M. Scatter
32BI206	Besant	Besant Points	C.M. Scatter
32BI269	Besant	Besant Points	C.M. Scatter
32BI273	Besant	Ceramics 2180 +/- 390 BP 1890 +/- 230 BP	C.M. Scatter
32BI379	Besant	Besant Points	C.M. Scatter
32BI503	Besant	Besant Points Samantha Points	C.M. Scatter
32BI935	Besant	Besant Point	C.M. Scatter
32BI974	Besant?	Ceramics, Point	C.M. Scatter
32SL219	Besant	Besant Points	C.M. Scatter
32SL323	Besant/Sonota	Besant/Sonota Point	C.M. Scatter
32MZ257B	Besant	Besant Points	C.M. Scatter
32MZ262	Besant	Besant Points	C.M. Scatter
32MZ487	Besant Complex?	Side-Notch Points	C.M. Scatter
32MZ595	Besant	Besant Points	C.M. Scatter
32MZ713	Besant	Besant Points	C.M. Scatter
32MZ1025	Besant	Side-Notch Dart Ceramics	C.M. Scatter
32MZ1086	Besant	Besant Points	C.M. Scatter
32MZ1090	Besant	Besant Points	C.M. Scatter
32MZ1137	Besant	Besant Points	C.M. Scatter
32MZ1815	Besant	Besant Points	C.M. Scatter

The two other features were undatable surface hearths. Salvage excavation and screening of disturbed dirt recovered several large side-notched Besant points. Other points related to the earlier Pelican Lake Complex. However, given the disturbance, none of the artifacts could be directly related to the fire hearths. The Feature 1 date relates well with the Besant points and time frames. Stone boiling and heating fires were activities present at the site. Low amounts of recovered debitage materials suggest lithic reduction was not major activity (Simon and Borchert, 1981).

32BI135 is a large multiple component ceramic site located along the terraces of Government Creek. Hundreds of flakes, bone, tools and 35 sherds of decorated and plain pottery were recovered from the surface. The southernmost portion of the site contains about 25 sherds of well made incised and punctuated pottery with no cord marking. The sherds are identified as Plains Woodland ca. AD 200-800. The northern portion of the site contain 11 sherds of undecorated, more crude and friable pottery (Lau, 1981; Beckes and Keyser, 1983).

At 32BI273, Blacktail Bottom Site, archaeologists first monitored and then salvaged the site prior to construction of oil access roads. Two fire hearths were salvaged from the creek terrace along with a single pottery sherd, but no diagnostic projectile points. The Plains Village sherd is an extended or Terminal Middle Missouri or a Post Contact Coalescent variant. However, the dates from the hearths establish a Middle Plains Woodland occupation at the site. The material from Feature 1 dated 2180 +/- 390 BP and Feature 2, 1890 +/- 230 BP. It is possible the pottery recovered from the site may be erroneously identified as Plains Village and may actually relate to the Besant Complex which fit the dates from the salvaged hearths or alternatively the pottery represents a second occupation. Further analysis was not possible because of the small size of the single sherd (Borchert, Montgomery, Simon, 1982).

Middle Plains Woodland materials also came from excavations at site 32BI503 at a depth of 10 to 20 centimeters. The component is undated, but large side-notched Besant dart points and smaller Samantha arrow points were recovered. Samantha points are identical to Besant points only much smaller and represent a change from atlatl dart to bow and arrow technology. This indicates the occupation may relate to the terminal Besant Complex ca. AD 415-700 (Floodman, 1989). A Plains Village component was also found at the site in the upper 10 centimeters of the soil zones.

During the Cinnamon Creek Ridge excavation project, Besant projectile points were found on the surface at two site locations. Site 32MZ257B produced two Besant points but additional testing failed to connect these points with any buried cultural component. Archaeologists collected a single Besant point at 32MZ262, but no subsurface materials or dates from either site could be related to the point (East, et. al., 1985).

THE ABRAXAS SITE-32MZ333

The Abraxas Site, 32MZ333, is a large, multi-component campsite at the head of a small box canyon. It lies in broken prairie country west of the Little Missouri River and along the Yellowstone River divide and watershed. It was discovered during a surface reconnaissance for a Pennzoil Exploration Company access road. Abraxas Petroleum Company sponsored subsequent testing, evaluation and mitigation. University of North Dakota Archeological Research-West conducted the preliminary testing which produced evidence of two buried cultural strata (Borchert, et. al., 1982). More extensive mitigation was conducted by Powers Elevation Company, Inc. (Floodman, et. al., 1982) along with a detailed geomorphic study by John Albanese of Casper, Wyoming.

Archaeologists identified four geomorphic surfaces at the Abraxas Site. These include the upper ridge crest and three Holocene stream terraces below the main occupation area. They also identified four distinct soils. The upper ridge consists of two main soil zones, P5 and P4. P5 is the oldest soil horizon and consists of a buried A horizon paleosol. P4 is the surface soil over the rest of the ridge crest and aeolian in origin. Three soils, P3, P2 and P1 (oldest to youngest) are found on the low terraces. Using these soils as horizon markers, archaeologists identified three cultural occupation events or horizons.

Cultural Horizon I is the oldest occupation was found beneath the P5 paleosol and overlies the Sentinel Butte bedrock sediments. In the excavated block unit, a cultural occupation came from Feature 9, a dark stain 2.3 by 1.5 meters in size at an average depth of 35 cm below surface. They recovered no diagnostics from the stained area or identified any post holes, but the feature be an occupational feature of skins or brush. A humic acid date of 2270 +/- 80 BP obtained from the stained soil dated to well within the Late Plains Archaic, Pelican Lake Complex.

In Cultural Horizon II, the P5 paleosol represents the main occupational event at the Abraxas Site. This level contains evidence of repeated short term site occupations which probably functioned as transitory camps. Four hearth features, a fire cracked rock roasting pit, several areas of ash burned earth from hearth cleaning, dense layers of flaked stone debris, tools, and Besant projectile points and associated ceramics establish it as a Middle Plains Woodland, Besant or Sonota Complex occupation. Radiocarbon dates of between 2041 +/- 124 BP and AD 210 bracket the occupation temporally. The paleosol developed in a wetter climatic period about 230 years after the Cultural Horizon I occupation event. Soil is younger than AD 210 as the materials were associated with the base of the paleosol horizon. Surface topography during this occupation would have been more rolling and undulating rather than the present swales with deeply incised channels downcut between 6 and 7.6 meters since AD 210, and the formation of the P5 soil.

Cultural Horizon III is within the P4 soil on the upper ridgetop overlying the P5 soil and cultural materials. This horizon had a fire hearth, arrow point tip fragments, lithics and fractured bison bone. The charcoal hearth, dating to AD 1692, places the occupation in the general Late Plains Woodland or Plains Village Tradition. The P4 soil suggests a drier condition after the P5 wet period with an

occupation hiatus of about AD 544. The drier period is interrupted by several humic bands/incipient soils which represent a wetter, more stable period within the general P4 soil accumulation. Cultural materials were found in one of these thin soil bands near the top of the soil profile.

A small terrace remnant found below the upper ridge contains a P2 soil of approximately the same age as the P4 soil on the upper ridge. This terrace contained bison bone from the remains of at least 4 individuals as well as flaked stone tools and debris. Based on similarities of soil development, and the presence of cracked bison bone within the P4 levels near the excavated hearth suggests a minor bison kill episode which may relate to Cultural Horizon III. Archaeologists did not identify any evidence of a depression or arroyo of sufficient depth to form a kill site. Analysis failed to identify a direct tie between the bison kill and the cultural occupation, but this relationship can be inferred from the recovered evidence.

The Abraxas Site has greatly added to the understanding of geomorphic processes in site development on the Little Missouri National Grasslands and to the knowledge of the Middle Plains Woodland, Besant/Sonota Complex occupations in this area. Associated geomorphic studies have furthered the understanding of the erosional and depositional processes in Badlands areas, and the formation and preservation of buried cultural horizons. Large areas of the site remain intact and available for future research.

Table 21: Middle Plains Woodland Sites on the YSR on the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ135	Unknown	Side-notched Point	C.M. Scatter
32MZ162	Besant Complex	Besant Point	C.M. Scatter
32MZ333	Besant/Sonota Complex	Besant Points Ceramics 1400 +/- 80 BP 1890 +/- 65 BP 1954 +/- 87 BP 2006 +/- 52 BP 2020 +/- 70 BP 2041 +/- 124 BP	C.M. Scatter
32MZ1065	Unknown	Side-notched Point	C.M. Scatter
32MZ1300	Besant Complex	Besant Point	C.M. Scatter
32MZ1303	Unknown	2010 +/- 50 BP 1540 +/- 70 BP	C.M. Scatter
32MZ1347	Besant Complex	Besant Point	C.M. Scatter

Surface collecting at sites 32MZ135, 32MZ1062, 32MZ1300 and 32MZ1347 produced large side-notched dart points which do not fit the classic Besant typology, but may relate to this complex. Further work is necessary to verify this supposition. A Besant point was collected from the surface of

32MZ162. The surface collected aforementioned sites are the only ones attributable to the Besant Complex currently known on the YSR of the LMNG.

Excavations at 32MZ333 identified Cultural Horizon II as a series of camps occupied during the Middle Plains Woodland period. A series of cultural occupations associated with the base of a distinct paleosol are represented by four distinct fire hearth features, one roasting pit feature, associated Besant projectile points, ceramics, faunal remains and lithics. Dates of these occupations range from 2041 +/- 124 BP to AD 60 as determined through radiocarbon and obsidian hydration dating techniques. It is hypothesized the site was revisited overtime with activities associated with short term hunting camps (Floodman, et. al. 1982).

Salvage excavation conducted at the Klandl Spring Site, 32MZ1303 discovered two eroding and deflated fire hearths exposed in cattle trails and deflation zones at this site (Floodman, 1998). Archaeologists salvaged the two hearths before erosion and associated impacts destroyed them. Feature #1 was radiocarbon dated to 2010 +/- 50 BP to AD 65. No diagnostics were recovered, but the dates fit well with the Besant/Sonota Complex. A second hearth feature was slightly younger in age at AD 395-600. This date may also reflect the Besant/Sonota Complex and strongly suggests a Woodland Tradition occupation event. Besant, Sonota, and Laurel complexes coexisted from AD 200-600 on the Northern Great Plains. Lacking the presence of other diagnostic materials, any of these complexes may be present at Klandl Spring.

Table 22: Middle Woodland Sites on the GA of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ173	Besant	Ceramics: ca. AD 100-800	C.M. Scatter
32MZ233	Besant	Besant Points 1620 +/- 70 BP	Stone Circles
32MZ278	Besant	Besant Point	Stone Circles
32MZ669	Besant	Besant Point	Stone Circles
32MZ679	Besant	Besant Point 2470 +/- 170 BP	Stone Circles
32MZ721	Besant	Besant Points 1420 +/- 70 BP	Stone Circles
32MZ727	Besant	1380 +/- 50 BP	Stone Circle
32MZ732	Besant	Besant Point Ceramics	C.M. Scatter

Archeological site 32MZ173 is a large and extensive cultural materials scatter tested in response to proposed oil well development. Excavations confirmed the presence of two cultural components, the oldest a Middle Woodland Besant/Sonota Complex. Analysis of ceramics from Level 3 yielded an estimated to date to ca. AD 100-800. While no hearths were excavated, a charcoal sample dated to AD 410 (Floodman, 1985a).

Archaeologists conducted testing at site 32MZ233 prior to oil construction disturbance. Stone circle Feature No. 1 at Block Area A had a mean interior diameter of 4.8 meters. Five square meters were excavated inside the feature. Two hearth features suggest the feature may have been reoccupied more than one time. Charcoal was recovered from a shallow, basin shaped hearth dated to AD 330, associated with the hearths were three Besant projectile points (Floodman, 1985a).

Site 32MZ278 is a large stone circle complex with numerous areas of tool stone cultural material exposed in road cuts and rodent mounds. During site recordation, a single Besant projectile point was surface collected, indicating a Middle Woodland occupation. The site was later tested in response to a buried electric cable project. No diagnostics were recovered, but excavators encountered a dense lithic deposit with fire cracked rock and oxidation staining and charcoal flecking. While insufficient organic materials were present for dating, this site has significant cultural materials and deposits (Penny and Larson, 1985).

Metcalf, (1987) tested two stone circles at 32MZ679 prior to pipeline construction through the site. A single test unit and several probes were placed within Feature 3. A hearth discovered in the center of the feature had insufficient charcoal for dating. Excavators recovered a Besant projectile point base from the test unit within the feature. The stone circle measured about 7 meters in diameter and single course. During testing and monitoring for another pipeline in the site area, a hearth feature dated to 2470+/-170 BP and also a base from a Besant point (Olson, 1992a).

At 32MZ669 archaeologists tested three stone circles during the same project as 32MZ679 (Metcalf, 1987). Stone circle 1 had a diameter of about 7 meters, stone circle 2 was about 6 meters in diameter and stone circle 3 was 8 meters in diameter. The features were deeply sodded with excellent soil. All probes producing cultural material were inside features. Excavation units inside each feature produced evidence of staining and hearths, but insufficient charcoal for dating. Besant point fragments were recovered from stone circles 2 and 3. The site contains dense cultural materials and features and remains essentially intact except for the portions excavated in 1987.

Archaeologists extensively tested 32MZ721, a large stone circle complex prior to oil development. Excavations at two features produced Besant projectile points. At Feature 15, a large multi-course stone ring of 7.7 meters mean interior diameter, they recovered a Besant projectile point base along with a variety of stone tools and lithics from the ring interior. Feature 18 is also 7.7 meters of mean interior diameter and contained three fragments of Besant projectile points and a smaller side-notched arrow point. Neither stone circle contained a datable hearth. Floodman (1988a) monitored the construction after testing. A shallow basin shaped hearth with fire cracked rock was located in an area exterior to all stone circles which dated to AD 530.

Another large stone circle feature was tested prior to oil development at 32MZ727. This stone circle exhibits a mean interior diameter of 7.1 meters and double coursed. Archaeologists did not find any diagnostics to relatively date, but located a shallow basin hearth with fire cracked rock near the center of the ring that dated to AD 570 (Floodman, 1986a).

STONE CIRCLE SITE-32MZ721

In 1986-1987 Powers Elevation Co., Inc tested and mitigated a large stone circle habitation site at 32MZ721, (Floodman, 1987a and 1988a). Texaco, Inc funded the data recovery program for the construction and drilling of the Silurian Unit 40-1 well and access. The site sprawls across a gently rolling terrain on a south facing aspect above an intermittent tributary of Sand Creek, just south of the Missouri River trench in the Charlson Oil Field. Site 32MZ721 covers approximately 12 acres and contained 55 identified stone circle features of varying size and construction. The Texaco well site was staked in the center of the site, covered about 3.5 acres and affected a total of 13, or 9%, of the identified stone circles. Initial testing in 1986 determined the site to be eligible for the NRHP and the mitigation in 1987 concentrated on five areas within the site - four stone circles and one identified exterior activity area. Archaeologists excavated 210 square meters during the mitigation program, about 1.4% of the well surface area and 0.1% of the total site area. Three hearth features, all from areas external to the stone circles, were excavated. Two circles provided radiocarbon dates. They recovered 1,360 artifacts pertaining to questions of chronology, activities and site function.

The site is covered by a thin veneer of Holocene soil developed over a Pleistocene landform. Cultural materials are restricted to the top 10 centimeters of the soil profile with the stone circle features buried to the base of the topsoil A horizon at 10 centimeters or less. No vertical stratigraphy was present at 32MZ721, but researchers distinguished different cultural occupations horizontally and corresponding to specific feature areas. Various aboriginal groups, Middle Plains Archaic, Middle Plains Woodland and Late Woodland periods, occupied the site through time.

The earliest identified site occupation was an external activity area centered on Feature 11, a small basin-shaped hearth. Excavators recovered portions of six Duncan projectile points from the block units around this feature. A radiocarbon date of (2830 +/- 80 BP) places the occupation late in the Middle Plains Archaic. They excavated 28 square meters around this feature and recovered 426 lithic artifacts.

Stone circle feature 13/14 has also been tentatively identified as a Middle Plains Archaic occupation. This is a large, single course, stone circle with a mean interior diameter 7.65 meters. A smaller interior circle of stone is located in the southeastern quarter of the larger feature which averages 5 meters diameter. About 43% of the interior of the larger circle is encompassed within this smaller interior ring. Archaeologists excavated 73 square meters encompassing the entire feature, and collected 256 lithic artifacts from the units. Of the total materials, 63% of the stone tools and 80% of the lithic debitage were within the smaller interior circle area of the larger feature. No features or datable organic materials were recovered. They however discovered a single diagnostic Duncan projectile point from the interior of the circle, underneath one of the interior circle rocks. A stone circle located closest to the Feature 11 block excavations, had a Duncan Complex affiliation.

Archaeologists tentatively identified stone circle Feature 15 as Middle Plains Woodland, Besant Complex. This is also a large, single course, stone circle with a mean interior diameter of 7.7 meters. And this feature also contained a smaller interior ring of stone with a diameter of 5.2 meters. The

smaller ring is more centrally located than in Feature 13/14. They excavated 25 square meters in the interior of the stone circle and recovered 180 lithic artifacts from the feature. No hearths or organically datable materials were located; however, they found a single base of a side-notched Besant projectile point.

Feature 18 is a large, single course, stone circle affiliated with the Besant Complex of the Middle Plains Woodland period. The mean interior diameter of the feature is 7.7 meters and had no interior course of stone. They excavated 78 square meters encompassing the entire interior of the feature as well as some of the adjacent exterior areas. The feature contained 435 cultural artifacts including five diagnostic projectile points or point fragments. Three of the points classified as Besant side-notched dart projectile points and one point is a smaller side-notched arrow point more closely resembling Late Plains Woodland.

The fifth point fragment appears to be corner-notched and may represent the Pelican Lake Complex and a Late Plains Archaic affiliation. Recovery of the previously mentioned point types outside and Besant material inside the stone circle places it within the Besant Complex. Archaeologists identified one exterior hearth in the northeast quarter of the feature, but it lacked sufficient carbon for dating purposes. A second exterior hearth located during the top soil removal, produced a radiocarbon date of 1420 +/- 70 BP which could relate to a terminal Besant Complex occupation.

The last feature excavated was Feature 20 a smaller single course stone circle with a mean interior diameter of 4.75 meters, and assigned to the Late Plains Woodland/Plains Village period (Late Prehistoric). Archaeologists excavated 29 square meters which encompassed the entire interior area of this stone circle. Units produced only 29 artifacts including two small Plains Side-Notched arrow points from the circle interior. A third notched tip fragment may be the same point style. No datable organic materials or hearths were recovered. A third point found below the level of the stone circle rocks was a large, lanceolate point with minute corner-notches which unrelated to the later site occupation.

Researchers hypothesized stone circle site 32MZ721 to be a short term hunting camp that was repeatedly occupied over time by aboriginal bands utilizing the upland grassland ecozone during seasonal rounds. The stone circles are the remains of tipi structures with rocks representing weights for the hide covers. Larger sized stone circles related to older occupations in the Middle Plains Archaic to Middle Plains Woodland periods. Besant Complex affiliations predominate with possibly a Duncan Complex. Smaller rings represent later Late Plains Woodland occupations. This pattern of affiliation for larger and smaller stone circles is supported by other tested teepee ring sites in the LMNG of the GA and related areas. Future work at related sites will help validate the initial conclusions.

One last excavated site produced Middle Woodland materials. The extensive campsite at 32MZ732 contained two Besant projectile points and two side-notched Plains Archaic dart points which may relate to this period. Excavation also produced 55 body sherds of cord marked Middle Woodland Besant pottery (Floodman, 1997). While no datable hearths were present, limited testing indicates that a highly significant Middle Plains Woodland occupation(s) is present.

In general, Besant and Middle Plains Woodland materials occur at both cultural material scatter sites and at stone circle sites. Stone circle sites are better known as more have been tested and diagnostic artifacts retrieved. Larger 7-8 meter single and multi-course stone circles contained Besant materials. The smallest ring to contain Besant materials was 4.8 meters at 32MZ233 (Floodman, 1985a). Ceramics were recovered at only two sites, both of which were cultural scatters. No ceramics were found at any tested stone circle ring site and dates range from 2520 BP at 32MZ679 (Metcalf, 1987) to AD 570 at 32MZ727 (Floodman, 1986a).

No evidence of the Plains Woodland, Besant or Sonota complexes has been found to date in the HR of the LMNG, the CR of the LMNG or Cedar River National Grasslands, the SR of the Sheyenne National Grasslands or the G/MT of the GRNG. This common cultural complex is sure to be present and future work will most certainly discover these cultural complexes in areas of the Dakota Prairie Grasslands.

Late Plains Woodland

Late Plains Woodland differs from the Middle Woodland in the widespread use of the bow and arrow technology along with improved ceramics and the beginnings of horticultural gardening. Late Woodland is part of Frison's (1978) and Beckes and Keyser's (1983) Late Plains Prehistoric Period which begins about AD 500 and runs until historic contact. It is a generic term for all bow and arrow cultures which follow the Plains Archaic Period. Complexes of the Late Woodland include Avonlea 500-1000 AD, Blackduck ca. AD 800 to protohistoric times, Mortlach AD 1500 to protohistoric times, Old Women's AD 1400 to contact and Sandy Lake AD 1000-1700 (NDCP, 1990).

Table 23: Late Plains Woodland Sites in the LMR of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32BI4	Unknown	Side-Notch Points	Buffalo Jump
32BI40	Unknown	Side-Notch Points	C.M. Scatter
32BI91	Avonlea	Avonlea Point	C.M. Scatter
32BI93	Unknown	Side-Notch Points	C.M. Scatter
32BI206	Avon Lea	Avon Lea Point	C.M. Scatter
32BI234	Unknown	Side-Notch Points	C.M. Scatter
32BI249C	Unknown	Side-Notch Points 255 +/- 125 BP	C.M. Scatter
32BI286	Blackduck	Ceramics Corner Notch Point 1715 +/- 260	C.M. Scatter
32BI304	Unknown	Side-Notch Points	C.M. Scatter

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32BI317	Unknown	Side-Notch Points 440 +/- 160 BP	C.M. Scatter
32BI332	Unknown	1370 +/- 165 BP	C.M. Scatter
32BI424	Avonlea	Avonlea Point	C.M. Scatter
32BI462	Avonlea	Avonlea Point	C.M. Scatter
32BI488	Unknown	Side-Notch Points	C.M. Scatter
32BI930	Unknown	Side-Notch Points	C.M. Scatter
32BI975	Unknown	Side-Notch Points	C.M. Scatter
32BI1057	Unknown	Side-Notch Points	C.M. Scatter
32BI1066	Avonlea	Avonlea Point	C.M. Scatter
32GV15	Unknown	Side-Notch Points	C.M. Scatter
32GV17	Unknown	Arrow Point Frags.	C.M. Scatter
32GV52	Unknown	Side-Notch Point 959 +/- 64 BP	C.M. Scatter
32GV404	Unknown	Side-Notch Point	Stone Circles
32SL44	Avonlea Unknown	Avonlea Point 2670 +/- 30 BP 1530 +/- 50 BP 545 +/- 120 BP	C.M. Scatter Stone Circle
32SL78	Unknown	Side-Notch Point	C.M. Scatter
32SL219	Unknown	Side-Notch Point	C.M. Scatter
32SL220	Unknown	Unnotched Point	C.M. Scatter
32SL224	Unknown	Side-Notch Point	C.M. Scatter
32SL240	Unknown	Side-Notch Point	C.M. Scatter
32SL250	Unknown	Side-Notch Point	C.M. Scatter
32SL325	Unknown	Side-Notch Point	C.M. Scatter
32SL402	Unknown	Side-Notch Point	C.M. Scatter
32SL405	Unknown	Side-Notch Point	Buffalo Jump
32MZ277	Unknown	Side-Notch Point	C.M. Scatter
32MZ343	Unknown	Side-Notch Point	C.M. Scatter
32MZ389	Unknown	Prairie Side Notch	C.M. Scatter
32MZ393	Unknown	Side-Notch Point	C.M. Scatter
32MZ397	Unknown	Side-Notch Point	C.M. Scatter
32MZ257B	Unknown	Side-Notch Point	C.M. Scatter
32MZ262	Unknown	Side-Notch Point	C.M. Scatter
32MZ319	Unknown	Side-Notch Point 1650 +/- 60 BP	C.M. Scatter
32MZ380B 32MZ380C	Unknown Unknown	530 +/- 55 BP 1180 +/- 35 BP	C.M. Scatter
32MZ427	Unknown	Side-Notch Point	C.M. Scatter
32MZ487	Avonlea Unknown	Avonlea Points Side-Notch Point	C.M. Scatter
32MZ512	Unknown	Side-Notch Point	C.M. Scatter
32MZ551	Unknown	Side-Notch Point	C.M. Scatter
32MZ558	Unknown	Side-Notch Point	C.M. Scatter
32MZ570	Unknown	Side-Notch Point	C.M. Scatter
32MZ952	Unknown	Side-Notch Point	C.M. Scatter
32MZ1030	Unknown	Side-Notch Point	C.M. Scatter
32MZ1113	Unknown	Side-Notch Point	C.M. Scatter

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ1211	Unknown	Side-Notch Point	C.M. Scatter
32MZ1184	Unknown	650 +/- 50 BP	C.M. Scatter
32MZ1595	Unknown	Side-Notch Point	C.M. Scatter
32MZ2079	Unknown	Side-Notch Point	C.M. Scatter

Along Anderson Divide, a date of AD 1695 was obtained from a hearth at 32BI249C, Feature 5. The hearth is from Level 5 and located at a depth of 30-45 centimeters below surface. The site also produced side-notched arrow points (Simon, Sheldon and Keim, 1983).

At 32BI332, the Rena Wynne Site, excavations revealed a Late Woodland occupation. Whereas archaeologists recovered no diagnostic projectile points or ceramics, a single hearth feature excavated in Level 2 (10-20 cm) of test units 3 and 4 provided a corrected radiocarbon date of AD 790-440. It was associated with a buried soil zone, and suggested the site was a short term camp (Simon and Borchert, 1984).

The Marsh Hawk Site, 32BI317, produced extensive evidence of Late Woodland occupations. Materials distributed in the lower portion of Level 1 of Zone A and Level 2 provided an estimated age of AD 450-1550. Feature 20, a shallow hearth, yielded a radiocarbon date of AD 1510. Plains Side-Notched arrow points were associated with the Feature (Simon and Keim, 1983).

Extensive excavations at Davis Dam gave evidence of Late Woodland occupations from 32SL44. The earliest occupation in Block 1 dated to AD 1285-1525 at Feature 1. Later dates in this block relate to Plains Village or possibly an earlier, associated Late Woodland occupation with Feature 1. At Block 2, temporal affiliation is more difficult. A date of soil and humic material from a paleosol suggest a date of 2670 +/- 30 BP. A second date from Feature 7 resulted in an age of AD 370-470. A probable Avonlea type projectile point would tend to support the latter date (Shaw and Kuehn, 1988). Several hearths suggest repeated occupations, some of which are probable Late Woodland cultural components.

At 32GV52, excavation and surface collection resulted in the collection of a small side-notched arrow point from Test Unit #2 Level 1. It associated with a large obsidian flake hydration dated to AD 891. The flake was from Obsidian Cliff in Yellowstone National Park (Rippeteau, 1982). Archaeologists did not discover and hearths or other datable materials. Surface collections of larger point styles suggest Plains Archaic dart points, but they were too fragmentary to type.

THE MAGPIE ROAD SITE--32BI286

The Magpie Road site is located among a site cluster on the Anderson Divide ridge along a level crest of a long, northwest trending ridge. In eroded areas, the ridge is nearly 150 meters in width, but constrictions on each end of the site form bottlenecks from the heads of hardwood draws. These draws fall away about 300 feet to the Magpie Creek valley on the north and the Whitetail Creek valley on the south. The site relates to a probable travel corridor through the Badlands, one of many such site localities along Anderson Divide.

The site is along the main access corridor along FDR 712 to expanding oil and gas fields in the project area. Fieldwork was sponsored by Tenneco Oil Company and tested and mitigated by Overland Archeology, Inc. of Boulder, Colorado, in the late summer of 1982 (Campbell, 1983). The site produced evidence of Late Plains Archaic and Late Prehistoric occupations, however, the erosional/depositional sequences have made the stratigraphic separation of these components almost totally indistinguishable.

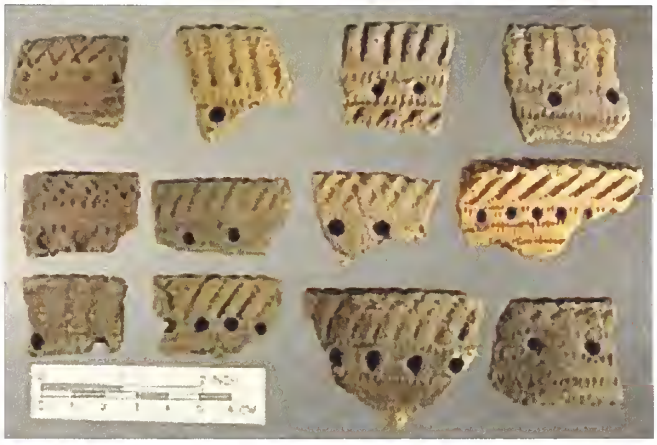
Diagnostic projectile point types, radiocarbon dates and ceramic typology established the chronology of the occupation. Early Plains Archaic is the earliest site evidence based on recovery of a single large side-notched a Lookingbill type projectile point base. Similar points from other sites in the region date to around 8000 BP to 5000 BP and are part of the Mummy Cave Complex. One projectile point was a Middle Plains Archaic, McKean techno-complex along with a second untyped, but possible Duncan projectile point. One point was a Pelican Lake Complex from the Late Plains Archaic and one was Besant Complex of the Middle Plains Woodland. Archaeologists classified three additional points as Late Prehistoric (Late Woodland) corner-notched arrow points. From these point types, it is assumed that a long string of cultural occupations overtime took place at the Magpie Road site.

Two radiocarbon dates came from fire hearth features at the site. Feature 1, a well defined fire hearth in Area C located at a depth of 12 to 42 cm below modern surface. Radiocarbon dating for this feature was 2140 +/- 175 BP, matching the time period of Late Plains Archaic, Pelican Lake Complex and transitional to the Middle Plains Woodland, Besant Complex. Feature 5 was located in Area A at a depth of 11 to 20 cm. below modern surface. A radiocarbon assay dated to AD 235 +/- 260. This date suggests a possible Middle or Late Plains Woodland site occupation.

As mentioned previously, the most interesting of the recovered materials at the Magpie Road Site were the Late Woodland ceramic pottery sherds of the early Blackduck Complex. Distribution of Blackduck ceramics comes from northwestern Michigan, the upper peninsula of Michigan, northern Minnesota, southeastern and south central Manitoba and east-central Saskatchewan. Blackduck ware appears by AD 800 and lasts into the historic contact period. The best dates for Minnesota are AD 960-1165 (Anfinson, 1979). The Magpie Road site is the only occurrence of the Blackduck ceramic wares found in western North Dakota and seem out of place on the Little Missouri National Grasslands. Syms (1977) noted that the expansion of the Blackduck Complex in the 8th century AD,

but early dates from the complex at Martin Bird site date to AD 200 +/- 205, AD 630 +/- 85 and AD 480 +/- 115. These dates are closer to the AD 235 +/- 260 date recovered from Feature 5 at Magpie Road. However, given the erosional context of the site, the feature containing the recovered ceramics may not have provided an accurate date.

Blackduck Ceramic Vessel From Minnesota



Blackduck Rim Sherds From Minnesota

Campbell (1983) considered two hypotheses to account for the presence of Late Woodland Blackduck ceramics in the Badlands of western North Dakota, a considerable distance from their known range of distribution. The first possibility is the occupation at Magpie Road site may be a Northwestern Plains Late Prehistoric culture with a single added ceramics component to its cultural technology. Generally in the Late Woodland the Badlands is dominated by nomadic hunters and gatherers who generally lack ceramic technology. The only direct evidence produced at the site is the association of the ceramics with the corner-notched arrow points. The Blackduck Complex is usually noted to contain a triangular or side notch arrow points.

However, the occurrence of Blackduck wares with corner-notch points is not impossible. The nomadic group may have acquired the vessel by diffusion through a network of trade, although the evidence from this site is unclear. The second theory hypothesizes the Magpie Road site represents a Late Woodland, Blackduck Complex occupation within the Badlands of the Little Missouri River--far from its normal range of occurrence. Site materials are again unclear on the answer to this question. Regardless it is a fact that Blackduck ceramics was found in a Badlands setting of the LMNG, and this site remains a very important clue to the human occupation of the Badlands during the Late Woodland period. Future work may more clearly elucidate the nature of the trade network and intermingling of the Late Woodland cultures in western North Dakota.

Based on the presence of small side-notched points and radiocarbon dates, several site components relate to Late Woodland occupations along Cinnamon Creek Ridge. All lacked ceramic pottery sherds, but some could relate to possible Plains Village occupations or other Late Woodland complexes. Small side-notched arrow points were collected from 32MZ262, three from 32MZ257B,

including one from Feature 4 which remains undated; and one point from 32MZ319 which had eroded from a cutbank. At 32MZ380C, a lithic scatter and fire feature were found with extensive cultural remains in Stratum XII, a paleosol dated to around AD 830. A hearth feature from 32MZ257B dated to about AD 730 suggesting a possible Late Woodland occupation. No other diagnostic materials were present. The most recent occupation on the ridge occurred at 32MZ380B Stratum XV dated to around AD 1480. A low density flaked stone and fire cracked rock scatter was associated with the soil layer (East, et. al. 1985).

Excavation at 32MZ1184 contained the remains of a possible Late Woodland occupation. A rock filled hearth feature dated to about around AD 1360, but had little associated material. (Borchert and Wermers, 1994). Presence of deer or antelope bone suggests cooking or roasting funetion had taken place. The feature may relate to either a Late Woodland Complex or perhaps a later Plains Village occupation. Further work at the site is necessary to define the full cultural spectrum of activity.

A single, isolated stand of limber pine is present in the southwestern portion of the Little Missouri National Grasslands in Slope County. A possible cultural origin for this stand of limber pine was suggested by Beckes, et. al. (1982). The limber pine (*pinus flexis)* has an edible nut utilized as food a source. A survey of the area noted a dense concentration of sites along the Cannonball Creek area and within the stand of limber pine. A single point of origin for the pine stand was noted with oldest tree at 208 years old (compared to 238 years old in an earlier study). The cultural origin of the stand cannot be positively stated, but all botanical, geological and archeological data support the hypothesis. Late Prehistoric (Woodland) groups around AD 1300 are the most likely candidates for the accidental or intentional propagation of the limber pine stand.

Table 24: Late Woodland Sites in the YSR Of The LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ65	Unknown	Side Notch Point	C.M. Scatter
32MZ84	Unknown	Corner Notch Point	C.M. Scatter
32MZ86	Unknown	Grooved Maul	C.M. Scatter
32MZ87	Unknown	Grooved Maul	C.M. Scatter
32MZ270	Unknown	Side Notch Point	C.M. Scatter
32MZ333	Unknown	215 +/- 60 BP 318 +/- 41 BP	C.M. Scatter Bison Kill
32MZ420	Unknown	Side Notch Point	C.M. Scatter
32MZ617	Unknown	Side Notch Point	C.M. Scatter
32MZ621	Unknown	Side Notch Point	C.M. Scatter
32MZ685	Unknown	Side Notch Point	C.M. Scatter
32MZ864	Avonlea	Avonlea Point	C.M. Scatter
32MZ1051	Unknown	Side Notch Point	C.M. Scatter
32MZ1288	Unknown	Side Notch Point	C.M. Scatter
32MZ1300	Avonlea	Avonlea Point	C.M. Scatter
32MZ1377	Unknown	Side-Notch Point	C.M. Scatter
32MZ1422	Avonlea	Avonlea Point	C.M. Scatter

Three sites are attributed to unknown complexes from the YSR. 32MZ84 contained a corner-notched arrow point, and 32MZ86 and 32MZ87 contained grooved mauls. These sites are probably within the Late Plains Woodland period, but at the current time the exact cultural complex and component is unknown.

Only two sites in the LMNG portion of the YSR are Avonlea Complex. At 32MZ864, archaeologists collected an Avonlea projectile point from the ridge edge and cutbank. Further excavation and testing failed to recover any Avonlea Complex materials to connect with the surface find. An Avon Lea point was also found on the surface of 32MZ1300. Further site investigations would undoubtedly reveal new information concerning this rare occurrence of Avonlea in the Little Missouri National Grasslands.

The only Late Woodland site excavated to date is Cultural Horizon III at 32MZ333. This component associates with Feature 4 a surface fire hearth. Tips of two arrow points tie to the radiocarbon date of AD 1795+/- 60 (which may be slightly younger due to severe rootlet contamination. An obsidian hydration date of AD 1692 +/- 41 may be more accurate (Floodman, et. al., 1982). The site also contained numerous cracked bison bone. Geomorphic studies at the site indicate a bison kill found in the draw below, belongs with this later cultural horizon rather than the older Besant site occupation. Thus, the Late Woodland occupation at 32MZ333 may be a temporary camp and processing area associated with a bison kill trap from the draw below. At least four bison were killed in this episode.

Table 25: Late Woodland Sites in the GA of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ669	Unknown	Small Corner Notch Arrow Points	Stone Circles
32MZ721	Unknown	Side Notch Points	Stone Circles
32MZ732	Unknown	Side Notch and Unnotched Points 1390 +/- 60 BP 1240 +/- 60 BP	C.M. Scatter
32MZ1353	Unknown	Side Notch Point	C.M. Scatter
32MZ1361	Unknown	Small Corner Notch Arrow Point	C.M. Scatter

A presumed Late Woodland occupation was reported at 32MZ669 by Metcalf (1987). Test units placed exterior to the tested stone circles discovered several small corner-notched projectile points, whereas, materials inside the stone circles suggest Besant. Excavations found no datable materials, but artifacts, characterized by the small, corner-notched points, indicate an undetermined Late Woodland group occupation.

At 32MZ721, small side-notched arrow points were recovered from the block excavation at stone circle Feature 20 and two Plains Side-Notched points from inside the circle perimeter. The radius of the stone circle was 4.75 meters. A third Plains Side-Notched point was found in the Feature 18 block excavations, defined later as a Besant occupation based on the recovery of three of Besant points within the circle. No hearth features or datable materials were recovered from the Feature 20 excavations. This is the smallest circle excavated at 32MZ721, and the only one attributed to a Late Woodland occupation (Floodman, 1988a).

Excavations at 32MZ732 provided extensive evidence of Late Woodland occupations. Archaeologists recovered 10 Plains Side-Notched points and four un-notched arrow points from testing areas scattered across the site. Two carbon dates indicate a Late Woodland occupation. Feature 10, a fire hearth, had a basin shaped pit containing a charcoal laden fill with little fire cracked rock and dated to AD 665-960. A second unassociated charcoal sample provided a date of AD 575-770 (Floodman, 1997).

Table 26: Late Woodland Sites in the HR of the LMNG

SITE NUMBER	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32BI4	Unknown	Side Notch Points	Bison Kill
32BI488	Unknown	Side Notch Points	C.M. Scatter

Two sites, 32BI488 an artifact scatter and 32BI4 a bison jump site, are believed to represent Late Woodland components dating from AD 750 to contact. Identification of these sites was based on the surface recovery of small side-notched arrow points.

Recent geomorphologic studies in the Sheyenne Delta region (Running, 1995) suggest the sand dunes in the SNG are relatively recent and definitely of late-Holocene age. Soils buried within Aeolian landforms imply long periods of stability with intervening periods of Aeolian activity and formation of the dunes. Formation of sand dunes relates to dry episodes of sparse vegetation with high potential for wind erosion and movement of the sandy soil. Recent work at the Soo Dune A (which corresponds to site 32RM33, a lithic scatter at the base of the dune blowout) indicates that two buried paleosols of very recent age are within the dune profile.

The uppermost soil is referred to as Ab1 (.80 to .95 meters below surface) had a radiocarbon date of AD 1390. A lower soil referred to as Lower Ab3 (1.32 to 1.49 meters below surface) dated to AD 1060. A mile west of this location, the Maddock Paleosol is exposed in another dune of 1.78 to 2.10 meters in depth. Soil dated to 2370 +/- 60 BP. Running estimates the potential of finding in situ cultural remains older than about 3000 BP in the SNG eolian dune settings is poor, due to the recent disturbance processes and erosion. This estimate correlates to the period of the single isolated artifact from the Middle Plains Archaic. All other dune area sites are more recent and contain pottery and side-notched arrow points of either Late Woodland (AD 500 to European Contact) or Plains Village (AD 900 to Historic Era) Traditions. In other words, the dune areas are not the places to look for

Archaic and Paleoindian sites. Swenson (1999) identifies ceramics from 32RM34 as Late Plains Woodland and ceramics at 32RM101 as simply late prehistoric.

The Late Prehistoric site (AD 750 to historic contact) 39PE184 is located in the G/MT area of the Grand River National Grasslands. The site was tested and evaluated as eligible for the NRHP. The only diagnostic artifacts are two Plains Side-Notched projectile points. One recovered from the surface and another from test unit #1 Level 1 (0-10cm). Archaeologists excavated a small fire hearth which extended into Level 2 (10-20 cm). No datable material came from the fill matrix. The site had a large number of flakes and was stratified with a possible second component in Test Unit 3 at 20 to 40 cm. The only diagnostic component is the Late Prehistoric Plains Side-Notched points. Cultural affiliation was difficult to determine because it could also be Plains Village, although there was no ceramic evidence (Floodman, Kurtz, LaPoint, 1994).

The Plains Village Tradition

George Catlin Painting of Mandan Village

Plains Village Horticulturalists

Plains Village Culture (1 AD-1780 AD) introduced horticulture to the Northern Great Plains. These inhabitants were semi-sedentary and lived in earth-lodge villages. Archeologists find earth-lodge village remains on the low bluffs just above the riparian floodplains. By 1780, dispersed Hidatsa, Mandan and Arikara villages dotted the Missouri River landscape from South Dakota to central North Dakota. Other farming groups lived on the Missouri's major tributaries: the Arkansas, Platte and Kansas rivers in the central Plains of Nebraska and Kansas.

On the fertile floodplains, women cultivated individual gardens of corn, beans, squash, sunflowers and amaranth. Females also retained ownership of the earth-lodges. Men were the hunters and warriors; they frequently left on trips of several weeks to hunt bison. Other tasks occurred such as quarrying material for stone tools and trapping of eagles. Concealing themselves in camouflaged pits dug along the high bluffs of the Little Missouri River, they used bait such as rabbit skin to attract and

catch golden and bald eagles. Tribal members captured raptors for feathers, a highly valued possession used in ceremonial functions. Eagle trapping was a highly ritualized activity involving prayer visuals, self-torture and elaborate ceremonies (Allen, 1983:4-22).

Personal vision quests, possession of sacred bundles and tribal renewal ceremonies were central to riverine horticulturalist's religion. Individual villages symbolically distinguished their sacred bundles thereby legitimizing the political and economic organization. Sacred bundles were central to the maintenance of traditional social order headed by a Chief, who was ostensibly the descendent of the original bundle owner. The bundle passed from father to son. Shamans were the religious specialists in both semi-sedentary and nomadic societies.

Mandan Lodge

Mandan men sought *xópri* (power) through a vision quest or the purchase of an inherited tribal or personal bundle. Rituals such as the Mandan's *Okipa* Ceremony were as elaborate as the nomadic group's Sundance. A host of powers centered in the Chief Above and Mother Corn the most important deities of the Arikara. Shamans normally opened sacred bundles yearly, spread out the contents and then recited the moral teachings of Mother Corn. Beginning by AD 1000, peoples with horticultural-hunter-gatherer lifeways were dominant. The ability to produce a surplus led to a more sedentary and permanent village type of earthlodges (Parks, 2001:374-381; Keyser, 2004:18, 24; Wood and Irwin, 2001: 356).

In the Middle Missouri area, the Plains Village Tradition emerged about AD 900 with the Initial Middle Missouri variant. Initial Middle Missouri sites are found clustered in the Big Bend region of South Dakota (Lehmer, 1971). The Coalescent began about AD 1400 with the appearance of the Initial Coalescent variant in the Big Bend area. Around AD 1550, this culture evolved into the Extended Coalescent variant with a geographic distribution from the White River to the North Dakota border. Coexistent with the Extended Coalescent variant was the Terminal Middle Missouri variant which was expressed in the region from the Cannonball and Knife-Heart Rivers of North Dakota about AD 1550 to 1675 (Lehmer, 1971).

Contemporaneous with the development of the Plains Village Tradition were several nomadic cultures of the Northwestern Plains with a patterned subsistence that depended primarily upon hunting and procurement of bison. Large kill sites are common over a wide area of the northern and northwestern plains. Reeves (1983) refers to the most recent cultural level at the Head-Smashed-In site (Alberta, Canada) as the Old Woman's Complex which dates to AD 850-1800. The Old Woman's Complex is used to describe all non-Plains Village sites with the presence of Prairie Side-Notched or Plains Side-Notched points in the region (NDCP, 1990) as part of the Late Woodland period.

Table 27: Plains Village Sites on the LMR of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32BI16	Plains Village	Ceramics	C.M. Scatter
32BI21	Plains Village?	Ceramics	C.M. Scatter
32BI69	Plains Village	Ceramics	C.M. Scatter
32BI135	Plains Village?	Ceramics 450 +/- 25 BP 330 +/- 25 BP 325 +/- 25 BP	C.M. Scatter
32BI137	Plains Village	Ceramics	C.M. Scatter
32BI234	Plains Village	Ceramics	C.M. Scatter
32BI273	Plains Village?	Ceramics	C.M. Scatter
32BI395	Plains Village	Ceramics Side-Notch Point	C.M. Scatter
32BI472	Plains Village	Ceramics	C.M. scatter
32BI503	Plains Village	Ceramics Side-Notch Point 738 +/- 130 BP 293 +/- 38 BP 320 +/- 11 BP	C.M. Scatter
32BI809	Plains Village	Ceramics	C.M. Scatter
32GV194	Plains Village	Ceramics	C.M. Scatter
32SL12	Plains Village	Ceramics	C.M. Scatter
32SL27	Plains Village	Ceramics	C.M. Scatter
32SL44	Plains Village	Ceramics 210 +/- 30 BP	C.M. Scatter
32MZ163	Plains Village	Ceramics	C.M. Scatter
32MZ266	Plains Village	Ceramics	C.M. Scatter
32MZ342	Plains Village	Ceramics Decorated Rim	C.M. Scatter
32MZ380D	Plains Village	Ceramics 665 +/- 40 BP	C.M. Scatter
32MZ422	Plains Village	Ceramics Side-Notch Points	C.M. Scatter
32MZ487	Plains Village	Ceramics Side-Notch Points	C.M. Scatter
32MZ502	Plains Village	Ceramics Side Notch Point	C.M. Scatter
32MZ586	Plains Village	Ceramics	C.M. Scatter
32MZ653	Plains Village	Ceramics	C.M. Scatter
32MZ1005	Plains Village	Ceramics	C.M. Scatter
32MZ1095	Plains Village	Ceramics	C.M. Scatter
32MZ1210	Plains Village	Ceramics	C.M. Scatter Eagle Trapping Pit

At 32BI21, a single ceramic sherd was recovered in test excavations and no dates were gathered from the hearths and associated materials. While not conclusive, the sherd may be Plains Village or it could be Middle or Late Plains Woodland in age (Fox, 1981). The sherds at the second, northern

most concentration at 32BI135 is similarly of questionable cultural identity. The southern and largest concentration was Plains Woodland, whereas the other ceramics were younger or more recent, thus possible Plains Village (Lau, 1981). These ceramics need further work and analysis to identify the exact component present. Excavations were conducted in 2010 (Toom, in prep.) and the report in progress, but the ceramics appear they may not be Plains Village as identified (Swenson, 1999).

At 32BI273, a single sherd was recovered. Based on its thinness and smoothed exterior surface the sherd dates to either an Extended or Terminal Middle Missouri or a Post Contact Coalescent Variant of the Plains Village Tradition (Borchert, Simon, Montgomery, 1982). Given its small size and quantity of material recovered, the sherd is not an absolute indicator of site age. Radiocarbon dates for the hearths dated to the Middle Plains Woodland. It is possible the ceramics are also of the Middle or Late Plains Woodland Tradition.

Testing at 32BI503 gives more conclusive evidence of a Plains Village occupation. A single pottery sherd collected from the site surface was part of a smoothed over simple-stamped vessel. It is consistent with the Plains Village Tradition materials, but a more accurate identification of the sherd is not possible. A two meter unit excavated in proximity to the surface sherd, Level 1, 0-10 cm, recovered an abundance of Plains Village Tradition materials. Three absolute dates were recovered, one from a radiocarbon date corrected to AD 1212+/- 130 years (Floodman, 1989). Two obsidian projectile points were from Camas-Dry Creek in Idaho dated to AD 1657 +/- 38 years and AD 1630 +/- 11 years. Plains Village sites are the only other sites that contain obsidian from this source (Baugh and (Nelson, 1988). Plains Village occupation of the site obsidian hydration dated to ca. AD 1619 to 1695. Radiocarbon years are believed to be error (Floodman, 1989).

At 32SL44, testing at two blocks suggest a Plains Village occupation. The Stone Ring excavation had grit tempered pottery with both plain and simple stamped exterior treatments. This is probably a Woodland or Plains Village occupation, although there were no absolute dates. At Block 1, radiocarbon dates indicate the probability of two occupational episodes, the first a possible Late Plains Woodland occupation at AD 1285-1525. Whereas the second test at Feature 3 dated to between AD 1630-1730 and Plains Village. Associated with Feature 3 is a tremendous amount of pottery assigned to a Plains Village origin. Findings indicate an extensive camp and processing area at this site with repeated occupations through time (Peterson and Foster, 1991).

Archaeologists located a Plains Village Tradition (32MZ380D) site along the Cinnamon Creek Ridge. Stratum VII was an extensive scatter of lithics, ceramics, bone and a fire feature dating to 665 +/- 40 BP. Ceramics were Initial Middle Missouri Variant which date from 1050-650 BP in other areas (East, et. al., 1985).

BADLANDS EAGLE TRAPPING by Walt Allen

The Little Missouri National Grasslands contain a well preserved complex of eagle trapping pits, possible eagle burial cairns, and conical timber ceremonial lodges. These cultural features are thought to be part of an elaborate ceremonial system practiced by the Mandan and Hidatsa, and described by several early ethnologists, notably Gilbert Wilson (1928) and Alfred Bowers (1950). Several preliminary archeological surveys in and near the Grasslands reported cairns, pits or lodges thought to be associated with the ethnographically reported eagle trapping ritual. But no systematic attempt was made to test this preliminary hypothesis or synthesize the extant data (Metcalf, 1963; Loendorf, 1978; and Sperry, 1981).

In 1980 and 1981, Walt Allen, a US Forest Service archeologist, undertook a comprehensive study of the eagle trapping phenomenon on the Little Missouri Grasslands, which involved extensive field reconnaissance in addition to a review of existing data. This work resulted in the documentation of 9 standing ceremonial lodges and at least 35 eagle trapping pits on the Medora and McKenzie ranger districts (Allen, 1981; and 1983). A detailed analysis of lodge and trap locations revealed a nonrandom pattern indicative of a sophisticated knowledge of Badlands topography and of Golden Eagle behavior on the part of the Mandan and Hidatsa tribes.

The basic pattern indicates that small groups of Indians would move into the Little Missouri River Badlands in the late summer/early fall on combined hunting and eagle trapping forays. Young men interested in acquiring the status and trade items connected with successful eagle trapping would engage the service of older, successful eagle trapping leaders who possessed the eagle magic and knew the correct eagle songs. Allen's research combined with earlier ethnographic studies of Densmore, 1923, demonstrated that the eagle trapping songs formed an important oral mechanism for retention of, and cross-generational transmission of such specific aspects of eagle behavior as: time of annual migration, prevailing winds, utilization of thermal currents by Golden Eagles, and methods of approaching prey.

Collapsing Hansen Lodge 32SL283

Trapping Pit 32BI1078 Hansen Complex

After arriving at a location acceptable to the eagle trapping leader, the group would construct a conical lodge of usually 40 to 80 juniper or willow poles leaned against a tripod of forked poles. The framework was then covered with bark, branches, and sod to form a durable shelter. They generally placed lodges in well hidden and inaccessible locations. While the practice of hiding the ceremonial lodges undoubtedly contributed to their remarkable preservation, it is not known whether this seclusion was motivated by ceremonial requirements and/or fear of roving Dakota enemies. Lodges also served as hunting shelters and were only considered sacred when the eagle hunting bundle or bison skull altar was placed inside. Sperry (1981) excavated the floor of a standing conical lodge in Theodore Roosevelt National Park. His discovery of a painted buffalo skull altar and many items traditionally associated with the sacred eagle medicine bundle corresponds remarkably well with a description of the Wolf Chief' bundle in Wilson's (1928: 145) study. This unusually close fit between ethnological accounts and archeological discoveries greatly adds to the significance of this unique site complex.

The Mandan and Hidatsa Eagle placed trapping blinds at carefully selected locations on high, west-facing ridges or escarpments, positioned to maximize successful trapping based on predicted eagle behavior. Blinds consisted of shallow rectangular or round pits excavated into the ground, with a lattice of branches and twigs placed over the top. Pits were large enough to conceal a man and very carefully camouflaged with prairie grasses and brush. A lure or bait in the form of an injured rabbit or other small animal was placed between the blind and the escarpment edge. When an eagle landed near the bait, the hunter would seize it. Extensive scars acquired in this fashion were highly regarded and contributed to personal status and beauty. After capture the eagle was bound and penned in the conical lodge until the end of the hunt. It was often ritually killed and buried after the valuable feathers were removed.

Motivation for this remarkable ceremony was both sacred and secular. Successful eagle trappers gained social status and "eagle magic" of their own, as well as feathers which were quite valuable as trade goods. Bowers (1950) reports that one eagle tail or 12 large feathers were equal in value to a good buffalo horse. And Blakeslee (1975) indicated Golden Eagle feathers were vital to the widespread calumet pipe ceremony, and intimately related to extensive inter-tribal trade networks which spanned the Great Plains and adjoining areas.

The complex of Mandan-Hidatsa eagle trapping sites preserved on the Little Missouri National Grasslands represents a unique and highly significant cultural resource. In addition to its obvious value as a potential National Register District, the complex has a great promise to address many research questions regarding Late Prehistoric/Protohistoric occupations in this part of North Dakota.

Testing in Concentration 2, of the Flat Top Butte Site (32MZ422), produced evidence of a Plains Village occupation. Eight small pottery sherds collected probably are from a single vessel. Although diagnostic rims were not recovered, the pottery fits well with other ceramics of the Plains Village period (Simon and Borchert, 1981b). Several recovered small side-notched arrow points support the Plains Village age classification. The Flat Top Butte Site had no datable features.

Testing at the Dune Site, 32MZ502, produced scant evidence of Plains Village occupation as well (Van Hoy, 1981a). One pottery rim sherd and five body sherds were collected. The pottery was generally too small for accurate identification of the wares. Vessel surfaces exhibit evidence of trailing and smoothing. And archaeologists also found a small side-notched arrow point. Given the ceramics and the point, they believe the site is from the Plains Village Tradition.

Site 32MZ1005 produced surface evidence of Plains Village occupation. At least two vessels from a single ceramic tradition were present in the surface collection. The vessels' rims are Talking Crow Decorated Lip type and assigned to the Extended Coalescent Variant of the Plains Village Tradition (ca. AD 1650 to 1750) and prehistoric Arikara (Newberry and Olson, 1991). Also associated were surface collections of small side-notched arrow points.

Eagle Trapping Complexes in the Badlands Study Unit

One last set of Plains Village Tradition culture sites are on the Little Missouri Badlands. A well preserved complex of eagle trapping pits (69), possible eagle burial cairns and conical timbered ceremonial lodges (7) are present in the LMR of the Little Missouri National Grasslands. Allen (1983) located and studied these sites in the Badlands areas of the Little Missouri. He recorded the seven conical timbered lodges and their associated eagle trapping pits. These sites are affiliated with historic and protohistoric occupations by the Mandan and Hidatsa who laid claim and trapping rights to the entire length of the Little Missouri River. The remaining lodges are estimated by Allen (1983) to post date AD 1880. Trapping pits date into the prehistoric era and represent continuing area through time.

Aquila chrysaetos—Golden eagle

Allen (1983) defined a ceremonial standing lodge with associated trapping pits as an Eagle Trapping Complex. He also located and studied associated site complexes. Lodges at 32BI143 and at 32BI401 have not had the locations of associated trapping pits researched. Eagle Trapping Complexes for the remaining sites have been identified as follows:

FIVE SPADES SITE--32BI503

The Five Spades Site is a cultural material scatter located along the crest of a linear rise south and west of the junction of two hardwood lined draws. The adjacent topography is open and rolling with a marked slope to the north. The draws are densely lined by hardwoods. And the shape of the site is defined by the course of the finger draws into a narrow, linear hill crest which opens to a broader plain to the south. The site is cut by a two-track trail and marked by numerous rodent backdirt mounds. It was recorded during a survey of a Sun Exploration well pad and access road by Powers Elevation Co., Inc. (Floodman, 1989). Limited testing consisted of 44 shovel probes in five linear transects and two 2 X 2 meter square test units along the proposed road corridor. Test results show the site to be horizontally and vertically stratified with cultural deposits to a depth of 30 cm. below modern surface. Evidence of at least two cultural components was present. One Level 1 (0-10 cm) component is representative of the Plains Village Tradition. The second component is a Middle Plains Woodland Tradition occupation and part of the Besant/Sonota Complex. This component is found in Level 2 (10-20 cm).

The earliest component at the site was a Besant/Sonota Complex occupation ca. 2050 BP to AD 750. Identification is from a Besant dart-point and two Samantha side-notched arrow points. Samantha points are known to occur as early as AD 415 and dominate the complex to AD 700. These two point types could have been deposited during one occupation event or from a series of occupations near the terminal end of the Besant Complex period. This is the only known occurrence of the Samantha point type in the Little Missouri Grasslands. These materials were found lower in the soil horizon at 10-20 cm. than the earlier Plains Village materials. In addition, most of the materials attributed to the Besant Complex are from different test units which support the idea of horizontal and vertical separation of the components at this site.

The most prevalent occupation at Five Spades is from the Plains Village Tradition. Diagnostic materials consist of a single pottery sherd collected from the surface west of the tested area. This sherd is from a smoothed over simple-stamped vessel. Paste attributes, surface treatment, and color are consistent with Plains Village ceramics that date from AD 900 to the historic period. Further identification of the period and cultural group is not possible given the small size of the single sherd. Two small Plains Side-Notched arrow points made from obsidian were also recovered from the test unit in Level 1 (0-10 cm). Artifacts were illustrated and photographed and submitted for hydration dating methods.

Obsidian was sourced to the Camas-Dry Creek area of Idaho. Few North Dakota artifacts come from Camas-Dry Creek, but all materials from this source are related to Plains Village sites (Baugh and Nelson, 1988). Resultant dates are AD 1619-1695, and AD 161-1641. In addition, a charcoal sample from the excavation unit dated to AD 1110 +/- 130). Given the evidence of mixing and the possibility of contamination of the scattered charcoal sample, the accepted dates for the site occupation are the obsidian hydration results. While exact identification of the cultural group is not

possible, it is hypothesized that the component may be either a Heart River Phase (AD 1400-1710) or Scattered Village Complex (AD 1400-1700).

Tipi Bottom Complex: 32BI847 lodge location; 32BI848 and 32BI849 are the pit locations.

Hansen Complex: 32SL283 lodge; 32SL284, 32SL285 and 32BI1078 are the pit locations.

Winter Wickiup Complex: 32MZ435 lodge; 32MZ1058, 32MZ1059, 32MZ1060 and 32MZ182 are the pit locations.

Easy Find Complex: 32MZ447 lodge; 32MZ1057 pit location.

Nelson Complex: 32MZ608 lodge; 32MZ1083, 32MZ1084, and 32MZ1085 are the pit locations.

Remaining pits are for locations which the conical timbered lodge structure no longer exist, or has not been located. Presence of these pits throughout the Badlands attest to the widespread nature of the eagle trapping ceremony in historic, protohistoric and prehistoric times among the Plains Village Tradition cultures of the Mandan and Hidatsa tribes.

Table 28: Plains Village Sites on the YSRSU of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ267	Plains Village	Ceramics	C.M. Scatter
32MZ506	Plains Village	Ceramics	C.M. Scatter
32MZ864	Plains Village	Ceramics	C.M. Scatter
32MZ1049	Plains Village	Ceramics	C.M. Scatter

Presently, three sites within the YSR contain Plains Village or Middle Missouri ceramics, although these surface collections have not been formally analyzed and identified as Plains Village materials. These sites are 32MZ267, a possible bison kill or processing area and 32MZ506 and 32MZ1049, both scatters of cultural material.

At 32MZ864, excavations recovered and confirmed a Middle Missouri Plains Village occupation in the 0-10 centimeter level of the site. Only limited excavations were conducted at the site and large areas remain which contain intact Plains Village cultural materials. Cultural materials extended to a depth of 90 centimeters. Other buried components are also present and surface finds of projectile points suggest Pelican Lake Complex and Avon Lea Complex occupations (Borchert, 1989c).

Two eagle trapping pit locations, 32MZ16 and 32MZ51 may be attributable to the Plains Village Tradition. Allen (1983) believes these sites as most likely associated with the Three Affiliated Tribes and the Plains Village cultures from the Middle Missouri area. The sites represent a specialized activity which is best known from along the Little Missouri River, but is documented in the Yellowstone River drainages as well.

Table 29: Plains Village Sites in the GA of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ173	Plains Village	Ceramics ca. AD 800-1862 1540 +/- 80 BP	C.M. Scatter
32MZ337	Plains Village?	Decorated ceramics	Stone Circles
32MZ732	Plains Village	Ceramics	C.M. Scatter

Site 32MZ173 is a Plains Village occupation. Ceramics recovered from the testing were a simple stamped form of a Middle Missouri Coalescent Variant, with an estimated date range of ca. AD 800-1862. The site also radiocarbon dated to AD 410, or 1540 +/- 80 BP and also contained a small side-notched arrow point (Floodman, 1985a).

Plains Village occupation of the 32MZ732 site area is also present. Three small sherds with a surface treatment of simple stamped design indicate a probable Middle Missouri cultures or influence. More extensive testing of this site may reveal a greater ceramic collection and more firmly date the occupation (Floodman, 1997).

Whereas the above sites were both cultural material scatters, Plains Village ceramics have not as yet been discovered at stone circle sites. One stone circle site however, has documented "decorated pottery sherds" in a possible midden area disturbed by rodent mounds (Beckes and Keyser, 1983). This site, 32MZ337, contains 38 stone circles of various sizes. It is the only stone ring site in the LMNG of the GA known to contain ceramics, although it has not been adequately identified to place them within any specific cultural tradition. Materials may be Plains Village, Middle Woodland or Late Woodland, and further research is necessary prior to an accurate assessment of their cultural association with site stone circle features.

Four eagle trapping pits, 32MZ282, 32MZ832, 32MZ1221 and 32MZ1222, are attributed to Plains Village utilization of the LMNG of the GA. Described by Allen (1983), they are most likely associated with the Three Affiliated Tribes and the Plains Village cultures from the Middle Missouri area. And they represent a specialized activity which is better known from along the Little Missouri River, but is well documented along the Missouri River as well.

Table 30: Plains Village Sites of the HR of the LMNG

SITE NUMBER	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32BI395	Plains Village	Ceramics Side Notch Points	C.M. Scatter

An artifact scatter (32BI395) located on a small butte top is believed to be Plains Village Tradition, AD 1000-1780. Cord marked ceramics and small side-notched projectile points came from the site. While not formally analyzed, archaeologists believe the ceramic sherds are Middle Missouri or Plains Village Tradition. Further work is necessary at this site to formally identify the cultural component present.

Currently, the prehistoric sites that are known on the SNG all relate to the Late Woodland or Plains Village cultural traditions. What is lacking is an accurate analysis of the ceramics to more clearly pinpoint the age and cultural affiliation of these sites. And further study should be undertaken to better understand the correlation between upland sand dune sites and lower terrace sites.

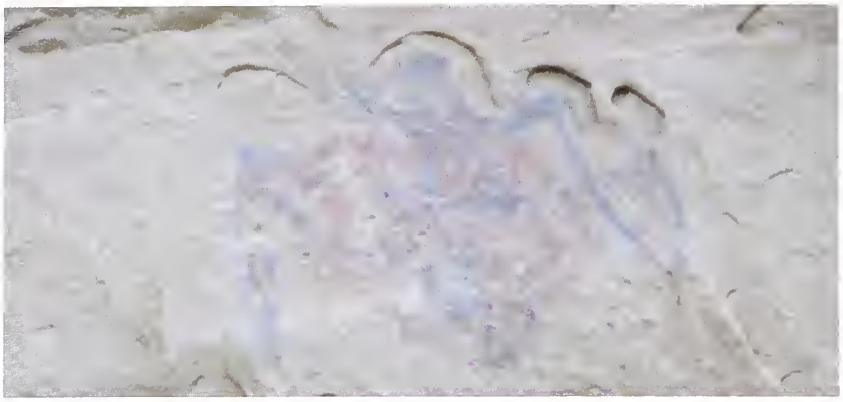
Allen (1984) tried to correlate some of the sites with known ceramic descriptions and cultural groups. He noted that the ceramic assemblage is difficult to assign with any real confidence. Assemblages are primarily Plains Village (AD 900-Historic) like ceramics and may relate to the Lisbon or Owego wares from the nearby Schultz site, and thus may be prehistoric Hidatsa. Allen also speculates that some ceramics are similar to Talking Crow Straight Rim (ca. AD 1400) and prehistoric Arikara, while some earth wares appear to be Sandy Lake Complex (AD 1000-1700).

These Ransom County sites (32RM14, 32RM15, 32RM16, 32RM17 and 32RM18) were re-evaluated by Swenson (1999) who suggested the pottery exhibits traits of the general Northeastern Plains Village Ware group ca AD 900-1000 (NDCP, 1990). No definite sites related to the Plains Village Tradition are currently known in the G/MT of the GRNG.

The Plains Equestrian Nomadic Tradition

Nomadic Hunter/Gatherers

The more accepted theory on the origins of the Sioux is that their ancestors slowly migrated from the north into the lake regions of Minnesota. A second theory, based on linguistics, postulates a more circuitous route that first traveled southeast to the Virginias and Carolinas. Following the bison herds, groups then moved west through the Cumberland Gap. Constant pressure from the Iroquois and Algonquin confederations forced the bands ever westward toward the northern forests and plains.



Equestrian Pictograph from Medicine Lodge Creek Site In Wyoming

The Dakota, Nakota, and Lakota were a loose confederation of related bands that spoke a variant of the Siouan language. During a series of expeditions from 1654-1659 AD, French explorers first made contact with these bands. The Sioux frequently fought with the Chippewa over occupation of the woodlands of northern Mississippi territory. Because of their earlier access to European traders and firearms, Chippewa armed with muskets had superior firepower over the bow and arrow of the Sioux. In the end, they blocked the Sioux from any further expansion north and pushed them out of the disputed territory.

Pressure from the Ojibwa and other woodland tribes and the attraction of buffalo hunting on the Great Plains encouraged the Siouan migration west. This pace accelerated once they obtained horses and guns. During their western movement, the Sioux displaced other tribes from traditional hunting grounds. Most major battles later fought with the US army were on lands the Sioux had taken from other Tribes after 1851.

The Sioux counted years by winters, thus their year represented portions of two winters. They drew pictorial representations of important events on buffalo hides. Called the Winter Count, a sequence of these illustrations painted on the hide covered many years. This was the Siouan pictorial historic record (Ewers, 1997:176-177; Mallery, 1971).

The Biesterfeldt site was a fortified village located near the Sheyenne River in eastern North Dakota. Originally thought a protohistoric Cheyenne village occupied as they moved westward to the Northern Great Plains. A transitional village as the Cheyenne changed from Woodland hunter/gatherers to Plains nomadic bison hunters. Recent excavations at Biesterfeldt by Michael Michlovic determined Plains Village people, migrating northeastward from the Missouri River Basin, occupied the fortified village (Vehik and Vehik, 1971:53-60; Wood, 1971 Michlovic, 2010).

The Teton Sioux (Lakota) were the first to leave the northern woodlands and eventually settled on the west side of the Missouri River in seven bands or council fires: Ogalala, Brule, Hunkpapa, Miniconjou, Sans Arcs, Oohenonpa (Two Kettles), and Sihasapa (Blackfeet). All were nomadic hunters depending on bison for subsistence. They numbered around 18,000 by 1850.

Next to leave were the Yankton and Yanktonai (both Nakota) who settled between the Red River of the North and Missouri River. The latter tribe divided into the upper Yanktonai and the lower

Yanktonai or Hunkpatina. Last to leave were the Santee Sioux (Dakota) who migrated a short distance to the edge of the forest and prairies in southern Minnesota, just south and west of the Mississippi River. The Mdewakanton, Whapekute, Wahpeton and Sisseton bands made up the Santee Sioux confederacy (Clodfelter, 1998:17-23).

The Sioux as a people and the foundation for their society originates with the legend of the sacred pipe. According to the story, long ago in a time of famine, a spirit appeared in the form of a beautiful woman carrying a bundle. It held the first pipe that when smoked became a prayer that the spirits heard and would send buffalo. She taught the people their fundamental lifeways. Afterward she turned into a white cow buffalo and disappeared over the horizon, and thereafter known as the White Buffalo Cow Woman.

The most basic religious concept of the Sioux groups is *waken*. No single opinion exists as to the meaning of the concept (i.e. god/creator or clear distinction between good and evil); however, all sources do agree that *waken* is a powerful mysterious force found throughout the universe. These spirits reveal themselves in visions, lightning, four winds and leaders of the animal species such as spirit bear, spirit buffalo etc (Deaver and Kooistra-Manning, 2001:4.33; DeMalle, 2001:799).

The Sioux considered warfare an integral part of their life. According to the legend, White Buffalo Cow Woman said that anything done in battle was a good deed. For a man, combat was the essential underpinning for achieving status, a status shared by female relatives in Sioux society. Fighting the enemy was the honorable duty in a man's life; and the Sioux considered warfare a normal state of affairs with their enemies – not a temporary relationship. Individual acts of heroism were rewarded with war honors and battle tactics focused primarily on displays of individual bravery. An exception was the use of decoys to lure enemies into their ambush and considered a type of strategy (DeMalle, 2001: 805).

Fur Trade and Early Equestrian Period

Well-established trade networks existed among inter-tribal and intra-tribal Native American groups long before contact with Euro-Americans. From around 1,000 years ago, the semi-sedentary villages located on the banks of the Missouri River became important centers for the Middle Missouri trade system. Because of the paucity of edible wild plants, nomadic groups were attracted to the horticultural produce, corn in particular, grown by these communities. Maze and other cultigens augmented their meat rich diet. The majority of traded goods were perishable items such as foodstuffs and leather.

Nomads traded products of the hunt, whereas agricultural produce were the villager's contribution to the exchange. This trend continued into the historic period on the Great Plains. Around 1675, the British and French began introducing European commodities into Middle Missouri trade system. Sources came from Canada and the upper reaches of the Mississippi River. Popular trade items were metal tools, guns and ammunition, dry goods and other European products.

In 1738, the French trader Pierre Gaultier de Varennes de la Verendrye and party accompanied by the Assiniboine from central Canada, visited the Mandan villages on the Missouri River. The Assiniboine brought guns, powder and shot, kettles, axes, knives and awls. They traded with the Mandan for grains, tobacco, skins and colored plumes. Verendrye noted the Mandan were crafty traders and usually bested the Assiniboine in these exchanges. Upon his departure, he left two Frenchmen with the Mandan to learn the language. Coming from the southwest, the horse first reached the Northern Great Plains around ca. AD 1720-1750. The Mandan became aware of horses in 1738 AD when mounted western nomadic groups visited the villages. By 1775, most nomadic groups were fully adapted to a mobile equestrian culture. Several North Cave Hills rock art sites found in northwestern South Dakota show warriors, horses and guns (Toom, 1979: 62-65; Keyser and Classen, 2001: 21, 239).

This period includes those cultures across the plains which were dependent upon the horse in protohistoric and early historic times. Protohistoric times are the period of contact with European cultures, but prior to keeping historic records. No written records for the tribes of North Dakota occurred until the 1790's (NDCP, 1990). Frison (1978) and Beckes and Keyser (1983) refer to this period as the Protohistoric period which dates from AD 1780 to historic times.

In the Middle Missouri region, protohistoric cultures are classified under the term Post-Contact Coalescent (Lehmer, 1971). The Heart River phase identifies the beginning of the Mandan and Hidatsa tribes of historic times. The Disorganized Coalscent variant is roughly equivalent to the start of the historic period from AD 1790-1862 (Lehmer, 1971). First the Mandan and Hidatsa congregated in villages along the Knife River. They were later joined by the Arikara at Like-A-Fishhook Village. Further work is needed to clarify the cultural groups in the Northwestern Plains during this period from archeological standpoints.

Iron Point Billings County

Table 31: Plains Equestrian Nomadic Sites on the LMR of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32BI317	Unknown	150 +/- 125 BP	Stone Circle
32BI319	Unknown	Trade Bead	C.M. Scatter
32BI632	Unknown	Trade Bead	C.M. Scatter
32BI423/ 32MZ729	Unknown	0 +/- 160 BP	Stone Circles

Archaeologists surface collected a glass trade bead along with three fragments of small side-notched arrow points at site 32BI319. These materials came from the site's western end and probably represent a protohistoric occupation, estimated from the trade bead, to AD 1700-1850 (Simon,

FANTAIL CREEK SITE--32BI423/32MZ729

The Fantail Creek site is located on the crest of a gently rolling ridge top spanning the Billings and McKenzie County border in the badlands. It is located 1.2 km. from the Little Missouri River and .6 km. northeast of Fantail Creek. The surface component of the site is comprised of at least 19 stone circles that are imbedded in the sod and hard to see. Other possible stone circles may be present. The circles are composed of flat sandstone pieces that occur naturally around the site and ridge margin. The circles are associated with a thin and widespread scatter of lithic materials. The site was tested for a proposed Apache Corporation oil well pad in 1985 (Kuehn, 1986b).

Testing consisted of six rows of auger probes (86 total probes), four auger probes and one shovel probe in each of 14 of the 19 stone circles and the excavation of five 1 X 1 meter units, of which four were placed inside stone circles and one over an exterior concentration of fire-cracked rock. A total of 1,224 artifacts were recovered. These include 468 pieces of flaking debitage, 18 tools and cores (but no temporal diagnostics), 628 pieces of fire-cracked rock and bone fragments. Five of the stone circles produced evidence of hearth features and two were subsequently excavated. One stone circle contained two hearths, one beneath the level of the stone circle and representing an earlier component at the site.

Charcoal from the interior of stone circle #11 and associated with the upper stone circle component yielded a date of 0 +\- 160 BP or AD 1640 to present. The stone circle is most likely associated with either a Plains Village tradition or Plains Equestrian Nomadic tradition cultural group. More deeply buried cultural occupations are related to earlier, unknown temporal periods. Buried components are represented by artifact concentrations in darker soil zones (paleosols) and by the buried hearth in stone circle #11 at 20-26 cm below surface. The site is eligible to the National Register of Historic Places and is now well preserved and remains intact, the oil well not drilled within the site area.

Sheldon and Keim, 1982). They found another trade bead on the surface at 32BI632, which is from a similar time period (Klinner and Borchert, 1991). Kuehn (1986b) tested the Fantail Creek Ridge site (32BI423) a stone circle site with at least 19 stone circles are present. A single radiocarbon date of AD 1640 to Present suggests Equestrian Nomadic age. Earlier occupations are also presumed.

Table 32: Plains Equestrian Nomadic Sites on the YSR of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ33	Unknown	Gunflint	C.M. Scatter
32MZ767	Unknown	240 +/- 60 BP 260 +/- 60 BP	C.M. Scatter
32MZ1429	Unknown	Metal Arrow Point	C.M. Scatter

32MZ33 is a cultural material scatter located in the southwestern corner of McKenzie County. A single gunflint was recovered and identified from the collected lithic assemblage. The gunflint is a chert trade item of English manufacture that relatively dated to AD 1825-1850 (Keyser and Allen, 1986). At 32MZ1429, archaeologists found a metal arrow point on the surface, however, no other diagnostics were recovered. Presence of a metal point indicates a post-contact protohistoric cultural group.

While monitoring a pipeline construction, archaeologists discovered site 32MZ767 which consisted of a hearth and associated activity area, centered on the cooking and processing of bison. Kuehn (1985b) had two charcoal samples tested from the salvaged hearth which dated to 240 +/- 60 BP (AD 1710) and 260 +/- 60 BP (AD 1690). These dates indicate a possible early Equestrian Nomadic occupation or possibly a Plains Village occupation on a low terrace of the Little Missouri National Grassland YSR. Further excavation at this site may reveal new evidence of this occupation. While the hearth and immediate area were destroyed by pipeline construction, significant portions of the site remain intact.

Table 33: Equestrian Nomadic Sites on the GA of the LMNG

SITE	CULTURAL COMPLEX	DIAGNOSTICS/DATES	SITE TYPE
32MZ278	Unknown	Gunflint	Stone Circles
32MZ732	Unknown	Gunflint Trade Bead	C.M. Scatter
32MZ1474	Unknown	210 +/- 60 BP 110 +/- 60 BP Side-Notch Points	Stone Circle
32MZ1475	Unknown	70 +/- 50 BP	Hearth

Two sites, 32MZ732 and 32MZ278, are presumed to date to the Equestrian Nomadic Period. At 32MZ732, a surface find of a gunflint of local Knife River Flint (KRF) manufacture suggests a post-contact culture in possession of European trade items, primarily the gun. It also indicates the local manufacture of flints rather than trading for these items. Recent excavations recovered a single trade bead from this site which also tends to confirm a protohistoric occupation(s) (Floodman, 1997). A second gunflint, also of KRF, was surface collected from a second site in the area, 32MZ278. This is an extensive stone circle site with a variety of cultural materials. Future research at these and other sites should shed additional light on this poorly understood time period.

THE CLEAR CREEK PROJECT

In 2000, US Forest Service archaeologists conducted excavations at two sites, 32MZ1474 and 32MZ1475, as part of a Passport In Time project. These sites were located on low terraces above the banks of Clear Creek, a permanent stream and water source in Northeastern McKenzie County that flows northwesterly to Tobacco Garden Creek and thence north to the Missouri River. 32MZ1474 is a stone circle/tipi ring site with five identified features. Of these, Features 2, 3 and 5 were test excavated. Immediately across the creek is 32MZ1475 a large hearth eroding from the stream bank with a sparse cultural materials scatter. The goal of the project was to salvage the hearth and evaluate the sites for eligibility to the NRHP (Floodman, 2001a). Volunteers and archaeologists excavated sixteen 1 x 1 meter units at 32MZ1474 and two 1 x 1 units at 32MZ1475. Archaeologists recovered 1,910 artifacts the vast majority, 1,758, were faunal remains, while the remaining 152 artifacts were lithic debitage and tools.

At 32MZ1474, 957 bone specimens were recovered. Identified bison elements represent a Minimum Number of Individuals of at least three sub-adult or small bison, one fetal bison (in Feature 2) and a medium sized canid (in Feature 5). The incomplete character of the long bone elements suggest a considerable amount of bone marrow procurement occurred. High counts of small bone fragments suggest marrow extraction. Many bone fragments were further reduced and boiled for bone grease. A cervical vertebra portion represents a fetal bison that is slightly smaller than an unborn bison from a comparative sample. Assuming a normal April-May calving season, an occupation during the late winter/early spring can be hypothesized.

The recovered canid metatarsal was slightly smaller than a coyote and may be a small wolf or dog. A modified bone tool possibly use for digging also came from Feature 5. A bison thoracic vertebra dorsal spine was found in a vertical position in Feature 5 and was probably used as a stake. Three small side-notched arrow points were recovered in Feature 2, the only points found at the site. Interior hearths at Feature 2 and Feature 5 suggest possible cold and inclement weather and fits with the late winter/early spring timing for the site. The hearth in Feature 2 radiocarbon dated to 210 +/- 60 BP with calibrated age ranges from AD 1520-1575; AD 1625-1890 and AD 1910-1950. A date taken from the hearth at Feature 5 is 110 +/- 60 BP with the result outside of calibration range and estimates would date from AD 1720-1950.

At 32MZ1475, the excavation and hearth feature produced a total of 801 bone specimens. A Minimum Number of Individuals for the bone materials are one small adult bison and an unknown medium sized mammal (similar to bobcat or fox, but unidentifiable). Again, the small, fractured nature of the bone fragments suggests intensive bone reduction and bone grease manufacture. Several bone fragments had identifiable cut marks. Only three waste flakes were excavated from the hearth areas. A date of the Feature is 70 +/- 50 BP. The date is outside the calibration range. Estimates are AD 1780-1950.

These sites add important information about the protohistoric period of the Dakota Prairie National Grasslands. Dates suggest possible late Plains Village, Late Woodland or Equestrian Nomadic Tradition. And the sites are definitely within the late protohistoric period although no evidence of historic contact was in evidence.

At stone circle site 32MZ1474, a hearth discovered inside Feature 2, radiocarbon dated to 210 +/- 60 BP. The range of dates is AD 1520 to 1575; AD 1625 to 1890 and AD 1910 to 1950. Radiocarbon dates from a hearth inside stone circle Feature 5 dated to 110 +/- 60 BP. Estimated dates are AD 1720-1950 and the site also contained three side-notched projectile points. It appears to be a late cultural manifestation, possibly Equestrian Nomadic. Activities centered on bison processing and bone grease manufacture—fetal bison remains suggest a spring occupation (Floodman, 2001a).

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On the opposite bank of the creek, adjacent to the stone circles, is site 32MZ1475 which consists of a hearth eroding from the terrace bank. A 70 +/- 50 BP date came from this feature. Dates at 2 sigma range from AD 1780-1950. These three sites all statistically date the same, and may be related and part of one occupation. Activities of bone grease manufacture are similar. No other diagnostic artifacts were recovered from this site (Floodman, 2001a).

Predictive Modeling and Recommendations

Models

One of the early models of site location in the Little Missouri Badlands was developed by Arleyn Simon (1982a). Site locations were noted to cluster along ridge tops. The ridges are the dominant land form and offer excellent views to the surrounding valleys, easy access to available fauna and flora resources, and offer the most direct route through the rugged badlands. The ridges were offered as prehistoric trails offering the route of least resistance to travel and have endured into the historic time. Several ridge top site clusters such as Cinnamon Creek ridge, Flat Top Butte ridge, Anderson Divide, and Mikes Creek ridge were noted as examples of the early trail systems. Excavations along these ridge top areas have shown a broad and diverse cultural utilization from the Early Plains Archaic into the modern time.

Another early model of prehistoric utilization of the badlands was offered by David Kuehn (1982b). Availability of certain lithic raw material sources such as Knife River Flint and porcellanite should change through time according to his theory. Erosion and down cutting of the Golden Valley Formation, source of the Knife River Flint, is removing the original and lag deposits of this material,

while, at the same time, exposing more of the Sentinel Butte and Bullion Butte Formations, source of the badlands porcellanite. With the passage of time, more exposure of porcellanite should lead to an increased utilization of this lithic resource over Knife River Flint. As of yet, there is no clear evidence to support or refute the hypothesis.

James Keyser (1984), Sally Greiser (1985) and B. A. Nicholson (1988) developed hunter/gatherer settlement strategies for the Plains. Archaeologist Mark Hill (1988) utilized these publications along with geographic, environmental setting and topographic placement information from 160 archaeological sites, to develop a hybrid settlement pattern model. The study represents the Middle Archaic, Late Archaic, Plains Woodland and Plains Village utilization of the area by hunter/gatherers. The Badlands and Rolling Grasslands of the Little Missouri offered two distinct environmental settings and provided a wide and unique set of resources for aboriginal adaptation. He proposed four types of strategies:

Type A - Utilization of resources from a single region to the near exclusion of other regions

Type B - Utilization of resources from both regions that employed seasonal movement of populations between areas to optimally exploit certain resources.

Type C - Similar to Type A in that aboriginal peoples exploited one region to acquire particular resources that are seasonally associated with specific ecosystems or ecotones. This adaptive strategy could be altered or abandoned if the particular resource base collapses.

Type D – Oriented toward exploitation of one or more ecosystems or ecotones. Settlement would be of longer duration with a minimum of population movement.

Out of these strategies emerge two patterns of seasonal rounds:

Central Base Pattern – A long-term base camp along with a series of short term camps used for task specific extraction and limited activities.

Restricted Circulating Pattern – A number of small transitory field camps located in different environmental settings with no centralized base camp.

McKean peoples used the Little Missouri Badlands as their core territory with a Type C adaptive strategy with elk as the dominant resource. Pelican Lake groups abandoned the Type C strategy in favor of a Type B strategy with a Restricted Circulating Settlement Pattern utilizing the Rolling Grasslands ecosystem to hunt bison. Besant groups utilized a Type C, Central Base Pattern to exploit bison on the Rolling Prairie. The Late Prehistoric Period is a time of even greater focus on bison by the Pelican Lake and Besant inhabitants. Plains Village peoples following riverine routes to access the Badlands and utilized it in a Type A strategy, to the almost exclusion of the adjacent Rolling Grasslands. This was done presumably to exploit the Badlands unique resources such as Bighorn Sheep.

Pending Research and Projects

Paleoenvironmental Modeling and Paleoindian Research

This project will focus on paleoenvironmental modeling and Paleoindian research on the DPG and other adjacent areas to identify intact landscapes. No systematic examination using this methodology has taken place on the Grasslands or greater North Dakota. Research, modeling and some initial fieldwork will be done in 2012. However, the majority of field work, excavation, artifact analysis and report preparation will take place in 2013-2014.

Geomorphology is the study of existing landforms. This discipline provides answers concerning landscapes at the time of the first peopling of North Dakota around 12,000 years ago. Preliminary investigations will concentrate on locating Leonard paleosol of the Aggie Brown member of Oahe formation (Pleistocene/Early Holocene). Aggie Brown soil serves as a horizon marker for the late-Pleistocene (Kuehn 1993). We will examine NRCS official Web Soil Survey site information, county soil survey books, GIS topographic information, locations of known Paleoindian archaeological sites and recorded paleontological sites of extinct Pleistocene/Early Holocene mammals.

In addition, the project will include a survey of the existing literature, inventory of available private artifacts collections, pedestrian surveys and sample test excavations at newly recorded Paleoindian archaeological sites. Paleoindian paleoenvironmental modeling and survey is a major research topic in the 2009 North Dakota State Plan. Today some Holocene soils are deeply buried and others were stripped away by the hot, dry winds of the Altithermal. Remnants of intact 10,000 year old landscapes however are found in different parts of the grasslands.

As an example, in the Badlands, the lee sides of hills and ridges along with upland swales are likely candidates for areas of intact soils. Also the state's western sub-basin may have held water for a longer period. Both Pleistocene animals and Paleoindians were likely attracted to these locales (Gregg et al, 2009). This project will increase the knowledge base of intact landscapes and Paleoindian adaptation to the grasslands. Synthesize existing and new information into a final report. Use new site locational information, including endangered sites, to provide cultural resources management options to FS leadership. Update the State Plan, present professional paper(s) and write a publishable journal article.

National Register Nominations

The draft multiple property nominations for ridgetop sites, stone circle sites and eagle trapping complexes are being brought forward for listing on the National Register of Historic Places along with several individual nominations for prehistoric sites (Primary Heritage Assets) that are eligible to the NRHP.

Compilation of Radiocarbon and Obsidian Hydration Dates from the DPG

Table 34: Radiocarbon and Obsidian Hydration Dates LMR on the LMNG

SITE	DATE	LAB NUMBER	Calibrated Age Ranges*		REFERENCE
			1 Sigma (68.3%)	2 Sigma (95.4%)	
32BI22	1700 +/- 90 BP	Beta-1616	AD 228- 433 AD 495- 503	AD 128- 545	Simon & Borchert, 1981
32BI249C	2860 +/- 300 BP	AA-176	BC 1491- 1479 BC 1456- 762 BC 681- 672	BC 1870- 1846 BC 1810- 1804 BC 1775- 359 BC 275- 260	Simon & Keim, 1983 Simon, Sheldon, Keim, 1983
	3030 +/- 145 BP	GX-8371	BC 1431- 1110 BC 1103- 1074 BC 1065- 1056	BC 1608- 1569 BC 1562- 904	
	255 +/- 125 BP	GX-8366	AD 1483- 1685 AD 1731- 1808 AD 1927- 1951	AD 1449- 1892 AD 1907- 1953	
32BI272	1090 +/- 70 BP	Beta-3653	AD 885- 1020	AD 772- 1048 AD 1087- 1122	Aivaizian, 1981a
	3250 +/- 90 BP	Beta-3654	BC 1623- 1433	BC 1746- 1371 BC 1346- 1316	
	2990 +/- 215 BP	Mohlab	BC 1441- 969 BC 962- 931	BC 1753- 762 BC 681- 672	
32BI273	2180 +/- 390 BP	GX-9317	BC 764- 679 BC 674- AD 139 AD 156- 167	BC 1188- 1181 BC 1155- 1145 BC 1130-AD 643	Borchert, Montgomery, Simon, 1982
	1890 +/- 230 BP	GX-9318	AD 195- 209 BC 162- 131 BC 118-AD 391	BC 396-AD 608	
32BI286	2140 +/- 175 BP	GX-9294	BC 388-AD 18	BC 749- 687 BC 666- 642 BC 592- 576 BC 571-AD 239	Campbell, 1983
	1715 +/- 260 BP	GX-9298	AD 32- 36 AD 52- 601	BC 359- 276 BC 259-AD 782	
32BI317	-150 +/- 125 BP	GX-8373			Simon & Keim, 1983
	1905 +/- 130 BP	GX-8376	BC 48-AD 255 AD 305- 312	BC 337- 330 BC 203-AD 416	
	3570 +/- 270 BP	AA-173	BC 2290- 1607 BC 1572- 1559 BC1549- 1539	BC 2837- 2815 BC 2672- 1266	
	2255 +/- 150 BP	GX-10655	BC 510- 434 BC 428- 93	BC 763- 680 BC 673-AD 20	
	2100 +/- 60 BP	Beta-19114	BC 199- 44	BC 356- 284 BC 234-AD 25	Floodman, 1987
32BI332	1370 +/- 165 BP	GX-9683	AD 536- 879	AD 344- 1015	Simon and Borchert, 1984
32BI423/ 32MZ729	0 +/- 160 BP	A-4340	AD 1682- 1737 AD 1757- 1761 AD 1803- 1936 AD 1951- 1955	AD1524- 1558 AD 1565- 1566 AD 1631- 1955	Kuehn, 1986b

SITE	DATE	LAB NUMBER	Calibrated Age Ranges*		REFERENCE
			1 Sigma (68.3%)	2 Sigma (95.4%)	
32BI503	840 +/- 130 BP	Beta-25912	AD 1043- 1104 AD 1118- 1275	AD 903- 915 AD 968- 1333 AD 1336- 1398	Floodman, 1989
	293 +/- 38 BP	Mohlab 475-1	AD 1521- 1578 AD 1581- 1591 AD 1620- 1650	AD 1483- 1664 AD1788- 1791	
	320 +/- 11 BP	Mohlab 475-2	AD 1521- 1530 AD 1539- 1575 AD 1583- 1590 AD 1623- 1635	AD 1514- 1599 AD 1617- 1641	
32GV17 32GV17	1949 +/- 101 BP	Mohlab 288-030	BC 53-AD 176 AD 191- 212	BC 200-AD 260 AD 281- 324	Borchert, Porsche, Kuehn, 1987
32GV52	959 +/- 64 BP	Mohlab	AD 1021- 1058 AD 1064- 1155	AD 974- 1218	Rippeteau, 1982
32SL44	545 +/- 120 BP 210 +/- 30 BP	GX-13287 SMU-2051	AD 1287- 1453 AD 1651- 1677 AD 1765- 1772 AD 1776- 1800 AD 1940- 1951	AD 1257- 1640 AD 1645- 1684 AD 1734- 1806 AD 1929- 1951	Peterson and Foster, 1991
	1530 +/- 50 BP	SMU 2055	AD 437- 489 AD 512- 516 AD 530- 594	AD 422- 624 AD 629- 630	
	2670 +/- 30 BP	SMU-1990	BC 839- 801	BC 895- 867 BC 863- 797	
32SL100	5285 +/- 65 BP	AA-5208	BC 4230- 4195 BC 4175- 4041 BC 4012- 4004	BC 4314- 4300 BC 4261- 3973	Borchert, Klinner, Loendorf, 1991
	5300 +/- 60 BP	SMU-1842	BC 4231- 4193 BC 4177- 4046	BC 4317- 4297 BC 4262- 3984	
	5570 +/- 110 BP	Beta-17205	BC 4539- 4329	BC 4692- 4228 BC 4200- 4170 BC 4126- 4124 BC 4090- 4081	
32MZ38	2670 +/- 70 BP	Beta-2202	BC 901- 794	BC 1007- 751 BC 686- 667 BC 638- 619 BC 615- 594	Simon & Borchert, 1981a
	2110 +/- 90 BP	Beta-2203	BC 351- 299 BC 227- 223 BC 210- 37	BC 376-AD 32 AD 36- 52	
	4130 +/- 120 BP	Beta-2204	BC 2876- 2578	BC 3011- 2977 BC 2960- 2949 BC 2943- 2397	
	1740 +/- 80 BP	Beta-2205	AD 215- 407	AD 84- 437 AD 489- 512	
	1630 +/- 80 BP	Beta-2206	AD 345- 536	AD 242- 595	
32MZ257B	1280 +/- 90 BP	DIC-1932	AD 658- 783 AD 787- 820 AD 842- 860	AD 608- 902 AD 916- 967	East, et. al., 1985
32MZ319	1650 +/- 60 BP	SI-6167	AD 264- 276 AD 332- 438 AD 487- 531	AD 254- 541	East, et. al., 1985
	3480 +/- 70 BP	SI-6168	BC 1890- 1735 BC 1713- 1694	BC 2008- 2003 BC 1976- 1625	
	3710 +/- 60 BP	SI6169	BC 2199- 2159 BC 2154- 2027	BC 2287- 1943	
	4240 +/- 50 BP	SI-6170	BC 2909- 2862 BC 2807- 2758	BC 3001- 2993 BC 2928- 2833	

SITE	DATE	LAB NUMBER	Calibrated Age Ranges*		REFERENCE
			1 Sigma (68.3%)	2 Sigma (95.4%)	
32MZ319			BC 2718- 2707	BC 2819- 2660 BC 2651- 2634	
	4420 +/- 70 BP	SI6171	BC 3314- 3293 BC 3288- 3274 BC 3266- 3238 BC 3167- 3165 BC3108- 2922	BC 3338- 3206 BC 3195- 3147 BC 3143- 2909	
	4520 +/- 75 BP	SI6172	BC 3355- 3264 BC 3244- 3102	BC 3497- 3457 BC 3377- 3007 BC 2987- 2932	
32MZ380A	2105 +/- 60 BP	SI-6159	BC 202- 44	BC 357- 282 BC 257- 245 BC 235-AD 22	East, et. al., 1985
32MZ380A	2820 +/- 70 BP	SI-6161	BC 1111- 1102 BC 1084- 1064 BC 1057- 897	BC 1194- 1141 BC 1134- 822	
	4260 +/- 105 BP	SI-6124	BC 3017- 2839 BC 2814- 2676	BC 3322- 3272 BC 3268- 3235 BC 3171- 3162 BC 3116- 2569 BC 2516- 2500	
	5315 +/- 60 BP	SI-6162	BC 4233- 4144 BC 4137- 4053	BC 4324- 4289 BC 4267- 4034	
32MZ380B	530 +/- 55 BP	SI-6163	AD 1323- 1347 AD 1392- 1438	AD 1298- 1370 AD 1379- 1451	
	3155 +/- 70 BP	SI-6123	BC 1505- 1376 BC 1339- 1320	BC 1607- 1569 BC 1562- 1263	
	4195 +/- 80 BP	SI-6125	BC 2894- 2835 BC 2816- 2667	BC 3004- 2992 BC 2929- 2567 BC 2521- 2498	
32MZ380C	1180 +/- 35 BP	SI-6164	AD 780- 792 AD 804- 889	AD 723- 740 AD 770- 903 AD 915- 968	
	5355 +/- 100 BP	SI-6160	BC 4324- 4288 BC 4268- 4219 BC 4213- 4149 BC 4135- 4054	BC 4359- 3971	
32MZ380D	665 +/- 40 BP	SI-6165	AD 1281- 1310 AD 1360- 1386	AD 1271- 1329 AD 1340- 1396	
32MZ394	3550 +/- 60 BP	Beta-108707	BC 1964- 1867 BC 1848- 1774	BC 2112- 2102 BC 2036- 1738 BC 1708- 1697	Floodman, 1998
32MZ422	1470 +/- 40 BP	Beta-?	AD 566- 633	AD 467- 481 AD 534- 655	MacDonald, 1981
32MZ1005	2190 +/- 67 BP	DL-90-437	BC 362- 269 BC 264- 181	BC 391- 90 BC 72- 59	Newberry & Olson, 1991
32MZ1184	650 +/- 50 BP	Beta-63308	AD 1284- 1318 AD 1352- 1390	AD 1275- 1403	Borchert & Wermers, 1994
32SL218	60 +/- 60 BP	Beta 153052	AD 1694- 1727 AD 1813- 1839 AD 1841- 1853	AD 1679- 1764 AD 1773- 1776 AD 1800- 1939	Floodman, 2001
	1110 +/- 60 BP	Beta 153053	AD 881- 998 AD 1003- 1013	AD 778- 1022	
32GV158	1340 +/- 60 BP	Beta 153051	AD 643- 718 AD 742- 769	AD 591- 783 AD 788- 820 AD 842- 859	Floodman, 2001

SITE	DATE	LAB NUMBER	Calibrated Age Ranges*		REFERENCE
			1 Sigma (68.3%)	2 Sigma (95.4%)	
32MZ1647	760 +/- 80 BP	Beta-217560	AD 1176- 1297 AD 1374- 1376	AD 1046- 1092 AD 1120- 1140 AD 1148- 1328 AD 1341- 1395	Heimstra, 2006
32BI135	450 +/- 25 BP 330 +/- 25 BP	OS-85415 OS-85444	AD 1432- 1450 AD 1500- 1501 AD 1511- 1529 AD 1542- 1601 AD 1616- 1634	AD 1420- 1467 AD 1483- 1641	Toom, In Prep
	325 +/- 25 BP	OS-85445	AD 1515- 1532 AD 1537- 1598 AD 1617- 1635	AD 1486- 1604 AD 1607- 1643	

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Table 35: Radiocarbon and Obsidian Hydration Dates on the YSR of the LMNG

SITE	DATE	LAB NUMBER	Calibrated Age Ranges*		REFERENCE
			1 Sigma (63.8%)	2 Sigma (95.4%)	
32MZ333	215 +/- 60 BP	Beta-5000	AD 1638- 1691 AD 1728- 1811 AD 1920- 1952	AD 1520- 1592 AD 1620- 1712 AD 1716- 1891 AD 1908- 1953	Floodman, et. al., 1982
	318 +/- 41 BP	Mohlab 32-1	AD 1514- 1600 AD 1617- 1642	AD 1468- 1649	
	1400 +/- 50 BP	Beta-5123	AD 604- 665	AD 549- 692 AD 749- 763	
	1890 +/- 65 BP	Beta-4999	AD 57- 214	BC 39-AD 255 AD 304- 313	
	1954 +/- 87 BP	Mohlab 32-2	BC 87- 78 BC 55-AD 138 AD 198- 206	BC 177-AD 246	
	2006 +/- 52 BP	Mohlab 32-4	BC 83- 80 BC 54-AD 63	BC 165-AD 85 AD 109- 116	
	2020 +/- 140 BP	Beta-5724	BC 339- 329 BC 203-AD 130	BC 387-AD 256 AD 303- 315	
	2041 +/- 215 BP	Mohlab 32-3	BC 365-AD 139 AD 196- 208	BC 748- 688 BC 665- 644 BC 589- 579 BC 556-AD 431	
	2270 +/- 80 BP	Beta- 5725	BC 401- 345 BC 322- 205	BC 706- 695 BC 539- 95	
32MZ767	240 +/- 60 BP	Beta-14916	AD 1523- 1559 AD 1563- 1571 AD 1630- 1683 AD 1736- 1805 AD 1935- 1951	AD 1481- 1697 AD 1724- 1815 AD 1834- 1878 AD 1916- 1952	Kuehn, 1985a
32MZ767	250 +/- 60 BP	Beta-14917	AD 1521- 1578 AD 1581- 1591 AD 1620- 1680 AD 1740- 1741 AD 1763- 1801 AD 1938- 1951	AD 1468- 1695 AD 1726- 1813 AD 1837- 1843 AD 1852- 1868 AD 1873- 1876 AD 1918- 1952	
32MZ1303	2010 +/- 50 BP	Beta-108708	BC 86- 80 BC 54-AD 57	BC 165-AD 81	Floodman, 1998
	1540 +/- 70 BP	Beta-108709	AD 432- 577	AD 390- 647	

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Table 36: Radiocarbon Dates on the GA of the LMNG

SITE	DATE	LAB NUMBER	Calibrated Age Ranges*		REFERENCE
			1 Sigma (63.8%)	2 Sigma (95.4%)	
32MZ173	1540 +/- 80 BP	Beta-11377	AD 430- 588	AD 348- 369 AD 378- 653	Floodman, 1985a
32MZ233	1620 +/- 70 BP	Beta-11378	AD 357- 365 AD 381- 539	AD 256- 304 AD 313- 584	Floodman, 1985a
32MZ679	2470 +/- 170 BP	Beta-56767	BC 781- 406	BC 977- 168	Olson, 1992a
32MZ721	1420 +/- 70 BP	Beta-21749	AD 565- 665	AD 435- 490 AD 509- 517 AD 529- 720 AD 741- 769	Floodman, 1988a Floodman, 1987a
	2830 +/- 80 BP	Beta-18864	BC 1116- 902	BC 1254- 1238 BC 1214- 822	
32MZ727	1380 +/- 50 BP	Beta-14857	AD 609- 676	AD 569- 717 AD 743- 768	Floodman, 1986a
32MZ732	3180 +/- 80 BP	Beta-85351	BC 1602- 1592 BC 1532- 1380 BC 1335- 1322	BC 1660- 1654 BC 1638- 1262	Floodman, 1997
	1260 +/- 60 BP	Beta-85352	AD 671- 782 AD 789- 810 AD 847- 855	AD 656- 890	
	2400 +/- 60 BP	Beta-95447	BC 728- 693 BC 658- 654 BC 542- 398	BC 756- 684 BC 669- 606 BC 604- 389	
	3720 +/- 70 BP	Beta-95448	BC 2270- 2259 BC 2206- 2023 BC1991- 1984	BC 2340- 2313 BC 2310- 1920	
	1390 +/- 60 BP	Beta-95449	AD 596- 681	AD 546- 724 AD 739- 771	
	6770 +/- 50 BP	Beta-105506	BC 5709- 5639	BC 5740- 5616 BC 5584- 5571	
32MZ1474	210 +/- 60 BP	Beta-144932	AD 1641- 1692 AD 1728- 1811 AD 1920- 1952	AD 1522- 1574 AD 1584- 1590 AD 1625- 1892 AD 1906- 1953	Floodman, 2001a
32MZ1474	110 +/- 60 BP	Beta-144934	AD 1684- 1733 AD 1807- 1896 AD 1902- 1928 AD 1952- 1953	AD 1669- 1780 AD 1798- 1944 AD 1950- 1954	
32MZ1475	70 +/- 50 BP	Beta-144935	AD 1695- 1726 AD 1813- 1838 AD 1842- 1853 AD 1867- 1918 AD 1952- 1954	AD 1681- 1739 AD 1743- 1763 AD 1801- 1938 AD 1951- 1955	Floodman, 2001a

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